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Private Equity Value Creation in Finance: Evidence from Life Insurance

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Abstract

This paper studies how private equity buyouts create value in the insurance industry, where decentralized regulation creates opportunities for aggressive tax and capital management. Using novel data on 57 large private equity deals in the insurance industry, we show that buyouts create value by decreasing insurers' tax liabilities; and by reaching-for-yield: PE firms tilt their subsidiaries' bond portfolios toward junk bonds while avoiding corresponding capital charges. Previous work on affiliated or "shadow" reinsurance and capital management misses the important role that private equity buyouts play as recent drivers of these phenomenon. The trend we document is of growing importance in the private equity industry, with insurance accounting for close to a tenth of all PE deals from 2010-2014.

JEL Codes: G22, G24, G11, G28, G32

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1 Introduction

The private equity industry has changed tremendously over the last decade. Until the financial crisis, private equity investors followed the standard “buyout” playbook (Vandeveldt 2018). Specifically, private equity firms raised temporary funds with finite horizons, acquired companies, mitigated agency problems, and exited after a relatively short horizon (Jensen 1986, Jensen 1989).

Since the crisis, the playbook has changed. Private equity firms have begun raising money for vehicles that bring in investment funds in perpetuity, or “permanent capital” (Sender & Foley 2015). This is a direct response to the financial crisis, when private equity firms wanted to “go on the offensive,” but felt constrained by the possibility of mass redemptions by investors. They began to seek opportunities for longer-term sources of investment capital to free themselves from this constraint. We document this shift and its consequences for private equity value creation.

An important way private equity firms shifted to permanent capital is by acquiring insurance subsidiaries and investing their premiums. This provides a source of investment funds free from redemption pressure. Private equity owners describe these investments as mutually beneficial to the firm and the subsidiary: the firm benefits from access to investment capital, the insurance subsidiary through investment by skilled professionals. Private equity firms report plans to function as insurers in perpetuity, and in the rare cases when they exit their insurance investments, they often retain substantial control over their subsidiaries, which include post-IPO voting rights and management fees to compensate for continued investment of insurers’ premiums (Vandeveldt, Indap & Wiggins 2019). For some large private equity firms, these fees total nearly one-third of revenues.

Private equity has thus shifted to permanent capital by embracing an alternative business model: acting directly as an insurer over the long-run; rather than buying, overhauling, and exiting subsidiaries. This is not a new investment model: it was pioneered by Warren Buffet who profits through skillful investment of Berkshire Hathaway’s insurance premiums. But its widespread adoption is new.

Overall, this shift calls for a reexamination of the value proposition of the private equity industry, which this paper offers. Our main findings are twofold. First, private equity firms continue to create value quickly, even when their objective is no longer a fast (and profitable) exit from their insurance subsidiaries. Despite the fact that they now rely less on redeemable capital (for some large private

equity firms, permanent capital sources are responsible for over half of total investment funds),¹ the changes we document at the insurance subsidiaries in our sample suggest that the value creation still occurs quickly despite the discipline imposed by a finite fund horizon being lessened.

Second, the value creation we document is primarily through tax and capital arbitrage, providing empirical support for this oft-theorized (but less well-documented) aspect of the private equity toolkit (Kaplan 1989). Private equity firms, pushed by regulators, argue that their investments deliver value for insurers in a positive manner—through skillful investment of premiums—and so concern that insurance and private equity’s incentives are “misaligned” is overblown (Lawsky 2013). This paper suggests the possibility of a more negative picture. Insurance is an industry replete with opportunities for capital and tax management. Private equity firms are most attune to these opportunities and more aggressively exploit them. The possibility of private equity investment undermining the stability of the financial sector has encouraged strict rules that prohibit private equity ownership of banking subsidiaries. Interestingly, there are no parallel prohibitions in insurance, which facilitates the growth that we document.

Our paper begins by collecting a novel sample of private equity acquisitions of life insurance companies by hand-collecting data on the ownership structures of life insurance companies in the United States. Our data cover the universe of private equity investments in the life insurance industry between 2005-2014.

Our first contribution is to document the substantial growth of private equity ownership in the life insurance industry in the aftermath of the financial crisis. In 2009, private equity backed insurers were responsible for only 3 percent of sales in the fixed-annuity industry. By the end of our sample, private equity backed insurers were responsible for nearly 20 percent of the fixed annuity market. The dollar value of private equity investments grew tenfold between 2009-2014, from around \$23 billion to \$250 billion. A significant share of this growth is driven by three large buyout firms, whose concerted move into the insurance industry is now being emulated by their competitors.² These investments are part of a private equity shift toward longer-lived, or “permanent” sources of capital. Only a fifth of the transactions in our sample see private equity firms exit within five years, as compared with exit rates nearly twice as large outside the insurance industry (Strömberg 2007).³

¹See Hedlund (2019).

²To ensure anonymity, we do not disclose their identities. However, given their importance, at times we describe their behavior in detail.

³We exclude ‘exits’ such as IPOs after which PE firms retain significant control, or continue to derive capital from investment management agreements.

Our second contribution is to document exactly what these private equity firms do—on both the asset side and liability side of insurers’ balance sheets—when they acquire life insurers. Academics believe that the requirement to return to capital markets regularly pushes private equity firms to deliver large and immediate profitability gains (Axelson, Strömberg & Weisbach 2009). The flip side is that once funding sources are permanent, the incentive for quick remedial action is reduced (Jensen 2007). In the last decade, private equity firms have shifted to sources of permanent capital, like insurance premiums. If quick value creation is primarily the result of the finite horizon of private equity funds, we expect value creation to slow as capital sources become longer-lived.

This is not what we observe. Instead, we show that private equity firms deliver large and immediate capital and tax savings for their insurance subsidiaries. This makes private equity-owned life insurers more profitable than their similar non-private equity-owned counterparts within the year following their acquisition. Our results suggest that takeover specialists’ expertise creates value even when the pressure to raise follow-on funds is lifted.

We first document this value creation on the asset side of the insurers’ balance sheets. We show that after life insurers are bought by private equity firms, they immediately and substantially change their bond portfolios. Private equity-backed insurance firms are quick to increase asset risk without incurring any capital charges by substituting out of highly rated corporate bonds and into poorly rated private label asset-backed securities (ABS). In the past, this shift would have led to higher capital requirements. However, a post-crisis regulatory change decoupled capital charges for ABS from credit ratings (Becker & Opp 2014). Private equity-owned insurers take the most advantage of this regulatory change, moving aggressively into junk ABS. This shift boosts the yields on their portfolios relative to non-private equity backed insurers, with no commensurate capital charge.

This finding is consistent with Acharya, Gottschalg, Hahn & Kehoe (2013), who note that while subsidiaries of large, mature buyout firms outperform peers, leverage drives a large share of this outperformance. Private equity-owned insurers exhibit higher ROEs than non-private equity backed insurers. However, about a third of this outperformance is explained by the greater leverage they can take by avoiding higher capital charges on their risky ABS holdings.

On the liability side, we find that private equity backed insurers achieve lower tax rates through reinsurance with foreign affiliates. These sorts of reinsurance transactions are what Koijen & Yogo (2016) refer to as “shadow reinsurance.” We demonstrate that in recent years, much of the growth in

shadow reinsurance that Koijsen & Yogo (2016) document is attributable to the insurance subsidiaries of a single private equity firm. These subsidiaries reinsure their premiums to an affiliate that faces a zero percent corporate tax rate in its foreign domicile.

The idea that large buyout firms create value through tax management is well understood, albeit difficult to quantify (Kaplan 1989, Kaplan & Strömberg 2009). Much of the past literature discusses how private equity firms use of leverage in buyout transactions decreases tax liabilities since interest is deductible. Our results hint at another dimension of tax management: private equity firms are most attune to opportunities to book their subsidiaries' profits in jurisdictions with low tax rates. Interestingly, at least nominally, reinsurance for the sole purpose of tax savings is disallowed in the United States (Koijsen & Yogo 2016).

Finally, we consider who benefits from private equity value creation in the insurance industry. Historically, there have been two divergent views of private equity. One is a positive take, which suggests that these investments create social value by imposing discipline on managers through leverage, aligning managerial and shareholder incentives, and making much-needed operational reforms (Kaplan & Strömberg 2009). Another is a more negative view, that suggests that value creation accrues through rent extraction from exploitation of financial market misvaluations and tax preferences, creating value (but not social benefit) by benefiting shareholders at the expense of stakeholders—like consumers and the government (Eaton, Howell & Yannelis 2019).

We find evidence for this latter mechanism: in the insurance industry, private equity firms appear to create value primarily at the expense of taxpayers, by lowering subsidiaries' tax liabilities and increasing asset risk without commensurate capital charges.

In the short-run, the beneficiaries are shareholders, who own more profitable insurers; and to a certain extent, policyholders: we document that at least some portion of the significant tax savings (up to 80 percent for some private equity owned subsidiaries) and decreases in capital requirements benefit consumers directly. Private equity backed insurance subsidiaries offer better rates on annuities products. This contributes to their growing market share over our sample period.

However, in the long-run, the result may be insurers more prone to financial distress, to the detriment of policyholders, who depend on annuities products for retirement security; taxpayers, who may be on the hook for insurers' losses; and potentially even shareholders, who own riskier insurers. Regulators are concerned with these developments (Lawsky 2013, Wilkie Farr & Gallagher 2014). However, the increase

in risk is under-appreciated: we show that private equity backed insurers have roughly equivalent credit ratings to their less risky non private equity-owned counterparts.

Our paper complements recent work by Eaton et al. (2019). These authors suggest that it may be appropriate to be more skeptical of private equity investments in industries with intense government subsidy and opaque product quality. We point out that the same may be true in sectors with complex and decentralized regulatory requirements. The shift to permanent capital involves private equity firms raising funds from long-term investors in such industries, for example, from insurers and pension funds. It is too early to judge the consequences of these recent developments for overall financial stability. However, our documenting significant tax and capital avoidance by private equity owned insurers hints at the possibility that value creation in this context may be best understood as redistributive gains at the expense of taxpayers rather than social welfare enhancements. Shleifer & Summers (1988) suggest the same possibility in the context of hostile takeovers.

We also contribute to the literature on private equity and the impact of large buyout firms' investments on portfolio companies, including Eaton et al. (2019), Bernstein, Lerner, Sorensen & Strömberg (2016), Bernstein & Sheen (2016), Kaplan & Strömberg (2009), Boucly, Sraer & Thesmar (2011), Lichtenberg & Siegel (1990), Smith (1990), and Kaplan (1989). We are also closely tied to a growing literature that points out that private equity firms' business models are not static over time (Strömberg 2007, Guo, Hotchkiss & Song 2011). Additionally, we supplement recent work by Bernstein, Lerner & Mezzanotti (2018). These authors study the impact of private equity investments during financial crises and find that private equity-backed firms were not more sensitive to the onset of the crisis. Our focus is the aftermath of financial crises; we find private equity capital is quick to enter industries left vulnerable by the crisis. The long-term impact of these investments on firm and system-wide risk are an important area for future research.

We also relate to a recent line of work on the insurance industry and financial sector stability. Becker & Ivashina (2015), Koijen & Yogo (2016), Becker & Opp (2014), and Kirti (2017) all document the ways in which insurance firms reach-for-yield in the aftermath of the financial crisis. Our contribution is to illustrate that much of the increase in risk previously documented accrues to insurers that are owned by private equity parents. Finally, our focus on how life insurance subsidiaries provide a long-term source of permanent capital to private equity firms is a specific example of a possibility identified by Chodorow-Reich, Ghent & Haddad (2019), who suggest that financial institutions like insurers act as

“asset insulators,” holding assets for the long-run to protect their valuations from exposure to financial market fluctuations.

Our paper proceeds as follows. Section 2 describes the institutional setting. Section 3 presents the data. Section 4 lays out the empirical framework. Section 5 presents the core results for private equity risk-taking on the asset-side of the balance sheet. Section 6 details the main result on the liability side—an increase in reinsurance with foreign affiliates for large PE-backed insurers. Section 7 contemplates who the beneficiaries are from private equity-backed insurers’ relatively low capital requirements and tax exposure. Section 8 concludes.

2 Institutional setting

2.1 Private equity shifts to permanent capital

Private equity business models are not static (Strömberg 2007, Guo et al. 2011). Following the financial crisis, there has been a shift from repeat short-term funding structures to permanent capital. In the past, private equity funds were structured to require a return to capital markets regularly to raise new funds to avoid allowing private equity firms too much freedom (Axelson et al. 2009). After the crisis, opportunities for investment abounded, and private equity partners felt overly constrained by investors who threatened redemptions (Sender & Foley 2015). The desire to avoid the discipline imposed by short-term investment horizons led private equity to turn toward more permanent sources of capital.

This shift has been rapid: three of the four biggest US private equity firms currently manage more money in credit funds than in their private equity arms; compared to a decade ago, when debt funds accounted for less than 20 percent of total assets under management (Vandeveldt 2018). For one large private equity firm, half of its assets are now in permanent capital vehicles (up from just 10 percent in 2010), and investment fees from these vehicles total nearly half of all fee revenue (15 percent in 2010). Private equity firms have famously relied on the “2 and 20” compensation structure, with a success-based fee equal to 20 percent of the funds profit (Metrick & Yasuda 2010). Today, the largest private equity firms are increasingly dependent on the 2; not the 20: seeking sources of permanent capital that generate a steady stream of fees; rather than higher, but less predictable, earnings from leveraged buyouts and high value exits.

2.2 Private equity investments in the insurance industry

Plagued by capital losses that accumulated during the financial crisis, many life insurers chose to sell assets to raise capital. Private equity firms were ready investors, especially interested in the insurance industry because insurers provide their PE acquirers with long-term, stable investment capital that is insulated from market fluctuations (Chodorow-Reich et al. 2019). Although this is not a fundamentally new business model—Warren Buffet’s Berkshire Hathway has been investing its insurance premiums continuously for decades—it has spread broadly throughout the private equity industry since the crisis. During our sample period (from 2010-2014), purchases of life insurance subsidiaries represented [XX] percent of all private equity transactions (by number) and [YY] percent (by assets).

Life insurance subsidiaries provide a source of long-term investment capital for their private equity parents that generates a steady stream of revenues and fee income for management of insurers’ investment portfolios. Some criticize this model, suggesting that private equity firms exploit their insurance subsidiaries by over-charging for investment advice (Indap & Vandeveld 2018b) and lawsuits allege “looting” by PE parents (Indap & Vandeveld 2019).

2.3 Background on life insurance industry

Life insurers’ assets are substantial: collectively, they represent almost half of the assets of the banking industry, although they have received much less academic attention than banks. Life insurers’ liabilities are increasingly likely to be annuities contracts—either fixed-rate annuities that pay a fixed coupon upfront for a specific term, or variable-rate annuities, whose coupon varies over time (Poterba 1997, Becker & Ivashina 2015, Chodorow-Reich et al. 2019, Berends, McMenamin, Plestis & Rosen 2013). By 2014, the annuities share of the life insurance market had grown to over 70 percent, with fixed annuities representing around 25 percent of this total. Private equity investments during our sample period primarily involve purchases of fixed annuities providers.⁴

Several major changes have impacted the life and annuities insurance business in recent years and two seem most relevant for our analysis: (i) change in the capital treatment of asset-backed securities; and (ii) the regulatory and tax impetus for shadow insurance.

⁴Although smaller than the variable annuities market, fixed annuities products have become more attractive to investors in the aftermath of the financial crisis, as fears of market volatility have led investors to seek out products with less volatile returns. Many insurers exited variable annuities markets after the crisis (Kojen & Yogo 2017).

2.3.1 Change in the capital treatment of asset-backed securities

Insurance companies are subject to capital requirements to protect policy-holders. Since 1994, the NAIC has used a risk-based capital (RBC) system, with capital levels depending on a variety of risks: asset risk (from affiliate companies, fixed income investments, and equities); credit risk; reserve risk; and premium risk (Becker & Opp 2014).

Prior to the crisis, NAIC risk classifications depended entirely on bond credit ratings. Using the Moody's classification, NAIC-1 included bonds rated Aaa to A2 (described as prime and high investment-grade), and NAIC-6 included bonds rated Caa3 and below (described as default imminent with little prospect of recovery and in default).

During the financial crisis, rating agencies dramatically downgraded structured bonds: by July 2009, only 36 percent of pre-crisis AAA-rated CDO tranches remained AAA (Coval, Jurek & Stafford 2009). In the insurance industry, capital requirements would have risen drastically in response to these downgrades. To provide some capital relief, the NAIC changed the risk classification methodology for structured securities, which represented nearly 20 percent of insurers' assets, second only to corporate bonds. It selected PIMCO and BlackRock to perform "expected loss" assessments to determine the intrinsic value of insurance companies' structured securities holdings. The NAIC would then assess a capital charge on an insurer based on the difference between the book value that the insurer held on a security and the intrinsic value computed by PIMCO and BlackRock. Thus, a below-investment grade ABS security can (and often does) have an NAIC-1 rating if it is held at sufficient discount on the insurers' balance sheet.

Replacing ratings in this manner drastically reduced aggregate capital requirements—they were nearly \$4BN in 2012 and would have been five times higher under the old system. Becker & Opp (2014) highlight that the new "expected loss" framework results in greater asset risk exposure for insurers relative to the old ratings-based system because insurers are no longer forced to hold as much capital against future losses.

2.3.2 Shadow insurance

Reinsurance is essentially insurance for an insurance provider. The basic motives for reinsurance in the life and annuities business are four-fold: risk transfer, underwriting assistance, capital management,

and tax management (Koijsen & Yogo 2016).

Koijsen & Yogo (2016) focus on the rise of what they term “shadow insurance,” where liabilities are ceded to an unrated affiliate outside the scope of US insurance regulation. They document a large rise in shadow reinsurance since 2002, which they attribute to insurers’ successful avoidance of heightened capital requirements by reinsurance to a less-regulated affiliate.

Importantly, this opportunity for capital arbitrage did not exist in the annuities business, and yet reinsurance in annuities has grown significantly since the crisis—growth that coincides with the advent of PE ownership of annuities providers.

An alternative rationale for shadow insurance is tax management. According to Credit Suisse (2017), some insurers use reinsurance to achieve effective tax rates as low as 7 percent: well below the statutory rate in our sample period of 35 percent. Recently, reinsurance has been ceded primarily to one non-US domicile that currently has a zero corporate tax rate. One PE-backed insurer operating there has agreed to a zero corporate tax rate through 2035, even if the tax treatment of other firms changes. Thus, tax avoidance may be growing motivation for reinsurance, even though reinsurance for the pure purpose of tax management is disallowed in the United States (Koijsen & Yogo 2016).

3 Data

3.1 Private equity ownership

Using SNL Financial’s “Insurance Statutory Financial” (ISF) database, we identify life and annuities insurance firms with a registered NAIC code that operated between 2005-2014. We construct an original panel dataset of these firms by ownership structure. Our dataset designates each firm as either “PE-owned” or “non-PE-owned” in each quarter of existence during this period.

Although SNL identifies firms that have private equity investors, this classification system is imprecise: it often fails to correctly identify the transition to private equity ownership, and does not provide complete data on ownership shares.

Rather than rely on this data, we manually collect data on PE ownership using quarterly NAIC LIFE-QS and LIFE-AS regulatory filings. These filings provide (often complex) organizational charts disclosing ownership stakes of all large investors. PE ownership is not always straightforward to detect, as principals at PE firms, rather than the firms themselves, are occasionally listed as owners. In these

cases, we supplement regulatory filings by searching for relationships between the individuals listed and PE firms and transaction announcements. For insurers that we determine are PE-owned, we use Form A applications to seek approval for acquisitions of control or mergers to determine the precise date of the PE transaction, and whether the insurer that is acquired is merged or renamed. In cases when SNL is missing data, we search through news reports related to the insurers in our sample.

Individual insurance firms are often subsidiaries of multi-level holding companies. We consider an insurance subsidiary to be PE-owned if it is a subsidiary of a holding company with either a single PE-investor or a consortium of PE-investors owning a majority of the holding company’s stock. We exclude from our sample firms with private equity investors that collectively own less than 50 percent of the company. We employ a broad definition of private equity by including hedge funds, business development companies, and other private investment vehicles that are not necessarily conventional limited partnerships.

Our panel structure allows us to track individual insurance subsidiaries both pre-and post-PE ownership, with two limitations. First, when an insurance subsidiary is closed or merged into another insurer acquired by the PE acquirer, it is no longer a standalone observation in our sample. Second, when PE-backed insurers purchase a “book of business” from a non-PE insurer – a portfolio of assets and annuities liabilities – we do not label this transaction as a PE transaction. Said differently, PE transactions in our sample involve the transfer of an entire insurance subsidiary to a PE acquirer.

We limit our analysis to the 1,021 life and annuities insurance firms that report their assets between 2005-2014. We require data general account bond holdings to exist for the duration of our sample period. We also drop from our analysis 6 insurers that are PE-owned for our entire sample. After applying these criteria and excluding insurers with minority PE stakes, we are left with 960 insurers, of which 57 are PE-owned for at least one quarter, but not all quarters, between 2005-2014.⁵ Our sample coincides with rapid growth of PE ownership in the life insurance industry. PE ownership grew eight-fold following the financial crisis: representing just 0.5 percent of assets in 2010, and 4 percent of assets by 2014. By the end of 2014, PE-owned insurers accounted for 20 percent of new underwriting in the fixed annuities business.

These investments are part of a private equity shift toward longer-lived, or “permanent” sources of

⁵Our sample period ends in 2014 due to data limitations. Between 2014-2018, we identify eight further private equity transactions relating to life insurers in our sample, suggesting that the life insurance industry remains an increasingly important source of permanent capital for private equity firms (Indap 2018).

capital. About 21 percent of the transactions in our sample see private equity firms exit within five years. Exit rates are close to twice as large, 39 percent, outside the insurance industry (Strömberg 2007).⁶

In the last several years, private equity attention has shifted from being largely focused on fixed annuities providers to a broader swath of the insurance industry, including variable annuities, long-term care insurance, and insurers outside of the United States (Segal 2018, Indap & Vandeveld 2018*a*). Additional work that considers recent transactions and the nascent impact of private equity in other insurance markets is of interest.

3.2 Asset side of insurer balance sheet

We focus primarily on insurers’ general account bond holdings, which represent on average over two-thirds of their total assets. General account assets support liabilities with guaranteed returns—like term life insurance and fixed-rate annuities. Products with investment losses/gains passed through to consumers, like variable annuities and variable life insurance, are separate account products (Berends et al. 2013, Chodorow-Reich et al. 2019).

Data on bond holdings comes from SNL’s “Insurance Investment Holdings” database. We select only bond holdings with nonnegative fair values. We gather information on NAIC code, Fair Value, Par Value, Asset Type, Issuer Type, and NAIC Risk Designation. This search yields a total of about 973,000 firm-quarter bond observations. For the subset of private-label asset-backed securities that comprise much of the forthcoming analysis, we also procure information on bond credit rating history from Moody’s.

We classify each observation into NAIC risk category (NAIC 1 through NAIC 6) and asset class (corporate bonds, federal government bonds, state and public utilities bonds, foreign government bonds, private label asset-backed securities, federal government asset-backed securities, and hybrid securities). We exclude relatively insignificant bond categories like credit tenant leases, state and public utilities asset-backed securities, and foreign government asset-backed securities.

Table 1 summarizes the bond portfolio composition of firms in our sample as of year-end 2014. We report summary statistics for the average PE-owned and non-PE-owned firms. Corporate bonds and private label asset-backed securities are the first and second most common bond types for PE-backed

⁶We exclude traditional PE exits after which PE firms retain significant control, or continue to derive capital through agreements to continue investing premia and receiving management fees for these services.

insurers, representing on average 48.1 percent and 22.3 percent of all bond types, respectively. It is striking—and relevant for our forthcoming analysis—that PE-owned firms tend to have a much larger share of their assets invested in private-label ABS than non-PE owned firms (whose share in private-ABS averages only 7.4 percent).

By bond risk category, nearly all bonds (over 97 percent for both PE-backed and non-PE firms) are within the first two NAIC categories.

3.3 Liability side of insurer balance sheet

On the liability side, we focus on reinsurance agreements for U.S. life insurers from the Schedule S filings provided by A.M. Best Company for 2005-2014. These statements are filed annually by individual insurance companies who report to the NAIC according to statutory accounting principles. We also acquire ratings information for our insurance firms from A.M. Best (A.M. Best is a rating agency—much like Moody’s, S&P, and Fitch—which focuses on the insurance industry). We follow work by Kojen & Yogo (2016) on insurers’ reinsurance agreements. As in their study, we focus on Schedule S sections 1.1 (Reinsurance Assumed), 3.1 (Reinsurance Ceded) and 4 (Reinsurance Ceded to Unauthorized Companies).

The data provided by A.M. Best includes detailed information on all reinsurance agreements, with records of both reinsurance ceded from insurers to reinsurers and reinsurance assumed by reinsurers, at year-end for all authorized insurers and reinsurers that report to the NAIC. Importantly for our study, the data also contains detail on reinsurance ceded by an operating company to an unauthorized reinsurer that itself does not report to the NAIC—like a domestic or foreign captive (a subsidiary whose primary function is to assume reinsurance from its affiliates). Unauthorized reinsurers are insurers not subject to the same reporting and capital requirements as reinsurers covered by US insurance regulation (Kojen & Yogo 2016).

Following Kojen & Yogo (2016), from the Schedule S filings we collect information on the identity of the reinsurer, type of reinsurance, effective date, reserve credit taken (which can be thought of as amount of reinsurance) and type of life reinsurance agreement.⁷ The Schedule S filing contains

⁷Life reinsurance agreements include coinsurance, modified coinsurance, combination coinsurance, yearly renewable term, and accidental death benefit. The types of annuity reinsurance agreements are coinsurance, modified coinsurance, combination coinsurance, and guaranteed minimum death benefit. The latter (annuity reinsurance agreements) are of focus for our study.

information on the reinsurer including its name, domicile, whether it is affiliated/unaffiliated with the ceding company, whether it is authorized by US insurance regulators, whether it has received an A.M. Best rating, and what that rating is. Shadow reinsurers are defined as those that are affiliated (captives of the ceding insurer), not authorized by US insurance regulators, and without an A.M. Best rating.

3.4 Annuities rates

To ascertain the impact of private-equity investments on annuities rates, we use data from Annuity Rate Watch (ARW). ARW began providing data on fixed annuity offerings, primarily for use by insurance brokers, over two decades ago. It maintains comprehensive information on fixed annuities and currently monitors over 1400 products from over 80 different carriers, including many in our sample of PE-backed insurers. Because annuities products differ substantially in specific terms, we focus on five-year MYGAs (multi-year guaranteed rate annuities), a relatively homogeneous product, currently offered by most carriers in the ARW database. A MYGA is a fixed-rate annuity contract that functions essentially as a CD, with a penalty for early withdrawal. We can gather specific details about the MYGAs in our sample including their minimum value, “yield-to-surrender,” whether the annuity has a market value adjustment, and what the penalty-free withdrawal limits are. Granularity about the annuity offering terms allows us to determine which products are most comparable.

4 Empirical framework

To assess the impact of private equity ownership on various measures of risk and returns, we follow Eaton et al. (2019) in using three main empirical approaches: difference-in-differences regressions exploiting within-insurer variation, matching estimators, and a high-frequency visual event study. While private equity ownership is not randomly assigned to insurers, these approaches draw on our data in very different ways: comparisons between within-insurer variation over time, comparisons between insurers that are observably similar, and changes in insurers risk taking in the days around PE acquisition. All three approaches yield similar results, providing compelling support for the interpretation that the involvement of private equity parents drive our results rather than sample selection.

Our first approach relies on difference-in-differences regressions that exploit changes in insurers

ownership structures. We compare insurers that transition from non-PE owned to PE-owned to insurers that never experience a private equity investment. We drop insurers that are always PE-owned in the sample period. These regressions use the following structure:

$$\text{Outcome}_{i,q} = \beta_1 \text{PE} \times \text{After}_{i,q} + a_i + g_q + \epsilon_{i,q} \quad (1)$$

where i and q denote the firm and year-quarter, $\text{PE} \times \text{After}$ is a dummy with value one if the firm is PE-owned in a given quarter and zero otherwise, and a_i and g_q represent firm and year-quarter fixed effects respectively. We include firm fixed effects to control for time invariant characteristics, to address concerns that private equity firms may be acquiring firms that engage in more yield-oriented behavior ex ante. We include year-quarter fixed effects to control for possible time trends impacting insurers' portfolios, and double-cluster standard errors by insurer and year-quarter. We winsorize dependent variables for our regressions within type (PE-firm vs. non-PE firm) at the 5th and 95th percentiles to ensure that outliers do not drive our results. Our results are broadly similar when we do not winsorize.

Our second approach matches PE-owned insurers to insurers that do not experience a private equity investment but have similar business models and characteristics. We focus on three key dimensions on which insurers may differ that we can observe: size, business mix, and capitalization strategy. We capture these with log assets, the general account share of liabilities (a measure of the importance of variable annuities), the annuity share of general account liabilities (primarily capturing the mix between fixed annuities and life insurance products), and the ratio of regulatory capital held to required capital.⁸ Panel A of Appendix Table A.1 shows that PE-owned insurers do tend to be smaller, more focused on fixed annuities, and marginally more aggressive in their capitalization strategy than insurers that do not experience a PE investment on average. We employ propensity score matching to match PE-owned insurers to non-PE insurers, in the year prior to acquisition. Panel B of Appendix Table A.1 shows that our sample of matched non-PE insurers closely resembles our sample of PE insurers on observables.

Our third approach draws on daily trading data to conduct a high-frequency visual event study. We observe large changes in PE-insurers investments and risk taking within days of the transition to private equity ownership. We do not find systematic changes prior to private equity ownership, nor do non-PE insurers make any noticeable changes during the same days. This timing leads us to ascribe

⁸As we can only observe insurers liability mix at an annual frequency, we conduct our matching analysis at the insurer-year level. Standard errors are double clustered by insurer and year.

our results strongly to the presence of private equity parents.

5 Asset side results and discussion

Table 2 displays the point estimates for $PE \times \text{After}$ for each major asset class. We observe that private equity backed insurance subsidiaries substitute away from corporate bonds in favor of private-label ABS holdings. Specifically, they decrease their share of corporate bonds by over 7 percentage points and increase their private label ABS holdings by over 6 percentage points. This change corresponds to a 16% decrease in these insurers' share of corporate bonds (relative to the industry average of 46%) and around a 66% increase in the share of the bond portfolio that is private ABS (relative to the industry average of 9.5%).

Note that in Table 2 we also include a dummy for quarters in years 2010-2014 to illustrate general industry trends. We see that the life insurance industry as a whole is moving toward corporate bonds but only marginally away from private-label asset backed securities during this period. This suggests that the PE firms shift toward private-label ABS was a tilting of their portfolios in favor of new private-label ABS holdings rather than a transfer of these bonds from non-PE to PE-backed insurers.

Although these regression results point to a clear change in the bond portfolios of private-equity backed insurers, they say nothing about why private equity firms shifted so substantially into private label ABS holdings, nor do they allow us to comment on whether substitution away from corporate bonds in favor of private-label asset-backed securities is associated with an increase in risk.⁹

To examine the effect on risk, we first look at whether there were changes in the NAIC classifications of PE-firm bond portfolios. In particular, we ask whether the shift out of corporate bonds led to less holdings of relatively safe corporate bonds (NAIC-1), and more holdings of relatively risky securities (NAIC 4, 5, or 6). In Table 3, we see that there is no statistically significant difference in bond portfolio composition by NAIC category for PE and non-PE insurers. Panel A of Table 4 shows that even within private-label asset backed securities holdings, PE-backed insurers do not hold riskier securities. So, at first glance it does not appear that private-equity backed insurers are taking on additional risk, at least as measured by NAIC category, relative to non-PE firms.

⁹Some industry observers speculate that greater investment in structured securities is driven by investment expertise offered by PE owners. For example, Deutsche Bank (2017) suggests that one PE-owned insurer relies on the PE firm “to achieve an enhanced investment yield by investing in illiquid assets and taking on complexity risk ... Management estimates that this allocation increases the earned rate by nearly 130 bps over similarly rated corporate [bonds].”

Like Becker & Opp (2014) and Becker & Ivashina (2015), we explore whether there is evidence that insurers “reach for yield” within a NAIC category, a strategy that could increase portfolio yield without incurring a corresponding increase in capital charges. We know from Becker & Opp (2014) that private label asset-backed securities became attractive investments for insurers after the regulatory change that decoupled the NAIC risk assessment from a bond’s credit rating. Low-rated asset-backed securities whose default is imminent (rated CCC and below) can now be assigned a NAIC-1 (safest) rating if they are held on insurers’ balance sheet at a deep enough discount.

We note in Table 5 that both PE and non-PE firms took advantage of the opportunity to load up on risky high-yielding private-label ABS without incurring correspondingly high capital charges. Within their private-label ABS holdings, PE-backed insurers increased their share of junk private-label ABS even more than their non-PE counterparts, as demonstrated by the statistically significant coefficients on our $PE \times After$ indicator.

In Table 4, Panel B, we examine whether PE-backed insurers’ substitution to substitute away from corporate bonds in favor of ABS we document in Table 2 is related to the regulatory change documented by Becker & Opp (2014). We restrict our sample to Q4 2007-Q4 2014, as the regulatory change was implemented during the financial crisis – in 2008 for residential mortgage-backed securities, and 2009 for commercial mortgage-backed securities. We construct an “alternate NAIC category” for each bond by matching the asset-backed securities to Moody’s historical bond ratings. We are thus able to construct a counterfactual NAIC rating system to see whether private-equity backed insurers are substituting toward asset-backed securities with low credit ratings and no corresponding increase in capital charge, because of the new “expected loss” NAIC framework.

We see that private equity firms take greater advantage of this regulatory change. Although PE-backed and non-PE backed insurers have bond portfolios with similar NAIC ratings, PE-backed insurers appear significantly riskier if we focus instead on underlying bond ratings. PE-backed insurers have shifted away from corporate bonds in favor of below investment grade private ABS bonds. Using the old NAIC rating system (where NAIC ratings were tied to bond credit ratings) the asset-backed securities held by PE insurers would have 11.2 percentage points less NAIC-1 (safest) and 7.4 percentage points more NAIC-6 (riskiest bonds, credit rating of D and below).

In Appendix Tables A.2-A.4, we repeat our analysis in Tables 2-4, this time using as a control a matched sample of non-PE firms with similar observables. Our results are broadly unchanged when we

use the matched sample.

Could one argue that our results stem from reverse causality, and are not attributable to PE firms' actions? Is it possible that PE firms identified these insurance subsidiaries as attractive investments precisely because they were most attuned to the implications of regulatory changes?

A high-frequency visual event study based on daily transactions in private label ABS suggests quite the contrary. Panel A of Figure 3 shows average transaction patterns for PE insurers in event time in the months and days around acquisition by PE firms. Panel B of Figure 3 shows average transaction patterns for all non-PE firms on the same set of days. We separate the transactions into four categories: (1) those that are rated NAIC-1 in the new system, but would have been NAIC-4 or below in the old system (non-investment grade); (2) those that would be rated the same in the two systems; (3) those rated worse in the new ratings system than they would have been previously; (4) those for which Moody's ratings are not available (around 30 percent of our sample). We scale bond acquisitions by total insurer assets at the time of acquisition.

For PE firms, almost immediately following acquisition there is a dramatic increase in non-investment grade bond holdings assessed NAIC-1 capital charges under the new ratings system. On average, purchases of such bonds within the month immediately after acquisition amount to 1 percent of pre-acquisition assets. There is no systematic shift in PE firms' trading behavior prior to acquisition. Non-PE firms do not make any discernible changes on the same set of days where PE firms dramatically move into private label ABS.

The bonds purchased by PE firms are rated Ba1 and below, and yet incur the lowest possible capital charge (risk-based capital charge of 0.4 percent, per Becker & Opp (2014)). It is worth noting that if insurers mark down bonds already on their balance sheets, this would lead to a reduction in equity. This is of course not the case if insurers actively purchase bonds at a discount, as several of the PE firms in our sample appear to do.

5.1 Large PE insurers

Three PE insurance groups together account for a significant share of the total PE dollars invested into life insurance firms. Thus, it is worth separately investigating the extent to which these insurers take advantage of the regulatory change documented by Becker & Opp (2014) that allows them to hold junk ABS without having to incur high capital charges. We use the letters A, B, and C to refer to these PE

groups. To ensure anonymity, letters do not necessarily refer to the same PE group across figures and tables.

Table 6 shows that insurance firms controlled by each of the three largest PE-backed insurers in our sample tilts its portfolio toward private ABS holdings. In fact, these increases, ranging from 17 to 27 percentage points are large relative to other PE-backed insurers.

Table 7 makes clear that subsidiaries of two of the PE groups in our sample hold much less safe ABS (over 40 percent fewer investment grade bonds than their non-PE counterparts) and much more bonds that would have been rated NAIC-6 (bonds rated default imminent) under the old regulatory ratings regime—20.8 percentage points and 30.8 percentage points respectively. This means these PE-backed insurers are holding between eight and ten times more bonds rated D or below than the average insurance firm in our sample.¹⁰

In Table 8, we estimate the reduction in insurers’ capital requirement due to the change in the regulatory treatment of private label ABS (Becker & Opp 2014). Since 1994, the NAIC has used a risk-based capital system to regulate insurance companies. An insurer is required to hold a certain amount of risk-based capital (RBC) based on the risks of its assets and liabilities. The required RBC ratio = Equity/ σ , where σ is a composite measure meant to capture the various risks an insurer faces, including asset risk, credit risk, reserving risk, and premium risk (entering different R_i in the formula below).

$$\sigma = R_0 + \sqrt{\sum_{i=1}^5 R_i^2} \quad (2)$$

The RBC ratio is computed annually, and insurers whose equity is below two times required risk-based capital face regulatory intervention, which can be as extreme as the regulator taking direct control of the insurer.

To compute capital requirements under the old NAIC ratings system, we estimate the change in R_1 (asset risk) if NAIC ratings were assigned to ABS holdings based on credit ratings (per the old system) rather than the “expected loss” framework. We use these estimates of the change in R_1 to calculate bounds for the change in capital requirements. Suppose R_1 increases by Δ_{R_1} . Following Becker & Opp (2014), $2\Delta_{R_1}$ is an upper bound for the change in the overall requirement, as this ignores

¹⁰Note that while one PE group is increasing its private-label ABS holdings, it does not appear to take advantage of the regulatory change more than the non-PE firms. Instead, much of the increased yield associated with its ABS holdings comes with a higher capital charge.

the correlation correction implied by taking the square root of a sum of squares. To calculate a lower bound, we assume that $R_0 = 0$, and back out the largest possible sum of squares for R_2 to R_5 that matches the total reported capital requirement, given our estimate of R_1 .

$$\sum_{i=2}^5 R_i^2 \leq \Omega = \sigma^2 - R_1^2 \quad (3)$$

As the square root is a concave function, σ increases by at least

$$\Delta_\sigma = \sqrt{(R_1 + \Delta_{R_1})^2 + \Omega} - \sqrt{R_1^2 + \Omega} \quad (4)$$

The total capital requirement increases by at least $2\Delta_\sigma$.

For private-equity backed firms, required capital on the general account bond portfolio *overall* (not just for structured securities) is 10-20 percent lower than it would have been had these firms been assessed capital charges based on the ratings of the underlying bonds in their portfolio. For some, these numbers are exceptionally high—subsidiaries of two of the PE groups in our sample are required to hold 30-40 percent less capital overall than they would have been forced to hold had their RBC ratio been calculated with the old NAIC rating system. PE-backed insurers are responsible for over 20 percent of the reduction in risk-based capital documented by Becker & Opp (2014), despite representing less than 5% of the total life insurance assets under management.

5.2 Impact on credit ratings

In general, PE-backed insurers have lower ratings. The median rating for insurers of comparable size to the larger PE owned insurers is A+. Subsidiaries of large PE groups in our sample are rated A- or B++, two to three notches below median.

These relatively low ratings may be related to the capital and tax savings that we have documented, or may be a byproduct of PE-backed firms' tendency to make more private-equity style investments, which is less our focus. Examples include the purchase of sports teams with funds from insurance subsidiaries, and insurers purchasing stakes in PE firms' portfolio companies (Ablan & Stempel 2018, Basak & Perlberg 2018). Although not a regulator itself, A.M. Best's ratings are important to insurers because often institutional investors will not consider insurers' products unless their A.M. Best rating

reaches a certain threshold.

In Table 9, we investigate what would have happened to the A.M. Best ratings for some of the largest PE groups in our sample if their required capital ratios reflected the credit ratings of their bond portfolios rather than the new “expected loss” framework. We follow Koijen & Yogo (2016) to adjust the A.M. Best financial strength ratings and risk-based capital requirements under a counterfactual credit ratings approach.

In describing its ratings methodology, A.M. Best (2016) notes that every ten-percentage point decrease in the ratio of actual capital held/capital required lowers an insurers’ implied balance sheet strength by one notch. A.M. Best (2016) also explains that ratings explicitly rely on NAIC risk categorizations for US insurers. Here, we calculate an adjusted range for the statutory capital ratio by applying the old (rating-based) treatment of structured securities, and we assume that the A.M. Best capital ratio would move equivalently. As of year-end 2014, subsidiaries of two of the PE groups in our sample were rated A- or B++. If their capital surplus was computed using the credit ratings of the bonds in their portfolios rather than the new “expected loss” framework, these subsidiaries would be in the range of C++ to B. Ratings in this range would make these subsidiaries the lowest rated insurers of their size, and among the worst-rated in the entire A.M. Best universe.

While these magnitudes are not intended to be dispositive, even more modest decreases in A.M. Best ratings are inconsistent with the current view of the regulatory community. Instead, subsidiaries of one PE group in our sample were recently upgraded, allowing it access to institutional investors, suggesting that A.M. Best ratings may not fully reflect PE-backed insurance companies’ undercapitalization relative to their exposure to junk asset-backed securities.

6 Liability side reinsurance results

To enhance returns, in the last few decades, insurance companies have increasingly used “shadow insurance,” or reinsurance to an affiliated (captive) reinsurer not authorized by US insurance regulators. Koijen & Yogo (2016) suggest that since regulatory changes in the early 2000s increased capital requirements for NAIC-filing life insurers relative to their GAAP counterparts, the rise in reinsurance is related to NAIC filers ceding liabilities to affiliated GAAP insurers to avoid heightened capital charges. While this is a compelling explanation for reinsurance in the pre-crisis period, it fails to explain the

continued rise in shadow insurance in the aftermath of the financial crisis.

In recent years, shadow insurance contracts have overwhelmingly been initiated by private-equity backed insurers. Specifically, in Figure 4, we see that since 2011, PE insurers accounted for more than 90% of new shadow insurance for fixed annuities, and nearly 60% of total new shadow insurance. Less than half of the rise in shadow insurance since 2011 is in life insurance; instead, a significant fraction of recent reinsurance is in the annuities business, where there is no opportunity for capital arbitrage, as Kojen & Yogo (2016) discuss. While some portion of the growth in annuities reinsurance may be motivated by potential capital savings,¹¹ another motivation is tax savings. It appears that the increase in shadow insurance contracts in recent years is primarily related to reinsurance with a non-US domiciled captive by subsidiaries of one of the PE groups in our sample. As a result of this reinsurance, this insurer likely has a substantially lower tax burden.

While it is possible that the capital requirements outside of the United States are less stringent than domestic ones, it appears unlikely that this is the sole motive for reinsurance. Financial statements by a subsidiary of one PE group in our sample, domiciled in Jurisdiction X, indicate both that “under current [Jurisdiction X] law, we are not required to pay any taxes in [Jurisdiction X] on either income or capital gains” and also that “[we] have received an undertaking from [Jurisdiction X] that in the event of any such taxes being imposed, the Company will be exempted from taxation until the year 2035.” Interestingly, per Gray (2017), Fidelity and Guaranty Life, recently acquired by Blackstone, plans to transfer some of its business to jurisdictions outside the US through reinsurance to take advantage of more generous tax treatment.

7 Who benefits?

Given their tax and capital savings, we expect that private-equity backed insurers increase their ROE relative to their non-PE counterparts. This hypothesis is based on the following rationale: first, we anticipate that PE-backed insurers’ investment in risky bonds (below investment grade) precipitates a higher-yielding securities portfolio. We also know that these firms should be more levered, since they are holding bonds with relatively low capital charges. Additionally, we expect that allocating a larger share of their portfolio to alternative investments would also increase risk and boost yield. Also, because of

¹¹Some jurisdictions (unlike the US) allows insurers that match the maturities of their assets and liabilities to hold less reserves.

increased shadow insurance (particularly for one PE group in our sample) private equity-backed insurers bear lower tax burdens. Thus, both because of higher yielding bond portfolios and because of increased leverage, we expect PE-backed firms to have higher ROEs.

In Table 10, we verify that this is indeed the case: average ROE for PE-backed insurers is 11.4 percent, compared to an ROE for non-PE insurers of only 7.3 percent. This difference is statistically significant at the 5 percent level. Average ROE in 2014 for subsidiaries of some PE groups in our sample ranges as high as 13-20%. Interestingly, when we adjust ROE to reflect the extra capital that insurers would have to hold on their structured security portfolios, ROE for PE-backed insurers falls by nearly 15% (to 10%) whereas ROE for non-PE firms is basically unchanged, and the difference between the two is at best marginally statistically significant.

In Figure 5, we assess the impact of private-equity ownership on leverage and ROE. We illustrate this effect by considering the largest insurance subsidiary of one PE group in our sample. As expected, leverage and ROE rises in the aftermath of this PE group’s involvement. This is consistent with this PE group tilting its portfolio towards private-label ABS as well as the increase in shadow insurance immediately following its acquisition.¹²

We then adjust leverage and ROE in an “adjusted MBS” counterfactual. As expected based on our results for the whole sample, we see that leverage would have been reduced drastically under this alternative framework. That is, the book leverage ratio (assets/book equity) would have been nearly 50 percent lower in the fourth quarter of 2014 than the reported ratio.

ROE at year-end 2014 was around 25% for this insurance subsidiary. In the counterfactual world with capital charges assigned based on credit ratings alone, because of this PE group’s involvement, ROE would have still increased, but the increase would have been smaller (from around 5 to 14%) rather than increasing five-fold in the aftermath of the acquisition by a PE group.¹³ This calculation is based on our estimate of a lower bound of the change in the capital requirement.

¹²Figure 5 shows leverage and ROE on a quarterly and annual basis respectively, and we see leverage rise in the quarter following the acquisition. Figure 3 documenting daily private ABS transactions leads us to believe the increase may well be immediate.

¹³In Appendix Table A.4, we look at the reduction in capital requirement, increase in leverage, and impact on ROE for PE relative to non-PE firms using as a control a matched sample of non-PE firms. We see similar decreases in RBC requirement for PE-backed insurers.

7.1 Impact on annuities’ pricing

It is possible that some of the benefits from capital and tax savings that private-equity backed insurers receive enable them to price more aggressively relative to their competitors and capture greater market share. Their growth in recent years provides suggestive evidence for this possibility: PE-backed insurers’ share of new annuity sales jumped from below 3% in 2009 to nearly 20% today (LIMRA 2008, LIMRA 2013, LIMRA 2017).

In Figure 6, we compare the pricing of multi-year guaranteed annuities for subsidiaries of two of the PE groups in our sample to the non-PE insurers in our database. The data comes from Annuity Rate Watch (ARW), which provides quotes on rates for insurance products and is primarily used by insurance brokers to select products for customers. We procure data for a single date (April 2017) and restrict our analysis to insurers with an A.M. Best rating of A- or higher, creating a comparable sample. We look at rates on five-year MYGAs (multi-year guaranteed annuities), which function essentially like five-year CDs with a penalty assessed for early withdrawal. We see that the yield guaranteed by PE insurers is higher than that of other insurers. While there is high variance in yield offerings for different carriers with different terms, the average five year MYGA rates for the PE-backed insurers in the ARW sample are above the 75th percentile for the non-PE backed firms.

One issue in comparing annuities pricing by PE relative to non-PE firms is that it is difficult to find two insurance products with identical terms (minimum balances, penalties for early withdrawal, amount that can be withdrawn without penalty, commission terms, etc.). To facilitate comparison, in Panel B we focus on high-band or mid-band (with minimum values of over \$100K) MYGAs with market value adjustments (so consumers may bear some interest rate risk). For this subsample, only one PE-backed insurer remains in the ARW sample. It offers a five-year MYGA at 2.75 percent, which is higher than the 90th percentile of the remaining sample.

8 Conclusion

This paper documents the significant growth of private equity investments in the life insurance industry, which grew from \$23 billion in 2010 to nearly \$250 billion in 2014. This shift is a large part of private equity’s “new playbook,” which focuses on building up permanent sources of capital that obviate the need for repeated returns to capital markets for new funding.

Historically, the discipline imposed by a finite fund horizon has been thought of as incentivizing private equity firms to boost subsidiaries' profitability quickly. However, we document that even once this pressure disappears, private equity firms still deliver immediate and large capital and tax savings for their investors, in many cases acting within days of acquisition. The result is insurance subsidiaries that are more profitable than similar non-private equity-owned counterparts within months. This finding confirms that—despite a fundamental shift in the business model of private equity—private equity acquisitions continue to create value and do so quickly.

Much existing empirical work documents that takeovers create value by better aligning management and shareholder incentives, to deliver social welfare-enhancing reforms (Kaplan & Strömberg 2009). Some caution that these takeovers may benefit shareholders at the expense of other stakeholders, like consumers and the government (Eaton et al. 2019, Shleifer & Summers 1988). We find evidence for the latter mechanism. Private equity firms increase insurers' profitability through tax management, lowering tax liabilities by up to 80 percent, thus depriving the government of this revenue. They also add value by capital arbitrage, reaching-for-yield by purchasing risky bonds without increasing capital levels. This increase in risk is under-appreciated by the regulatory community, as private equity-owned insurers receive similar credit ratings to their non private-equity-owned counterparts. The implications for overall financial stability—and consequently, for stakeholders—are hitherto unclear.

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Figure 1: *General account bonds of PE owned insurers*

Notes: This figure shows bonds held by PE owned insurers in the general account (assets backing all liabilities not held in separate accounts). Bonds are valued under statutory accounting rules.

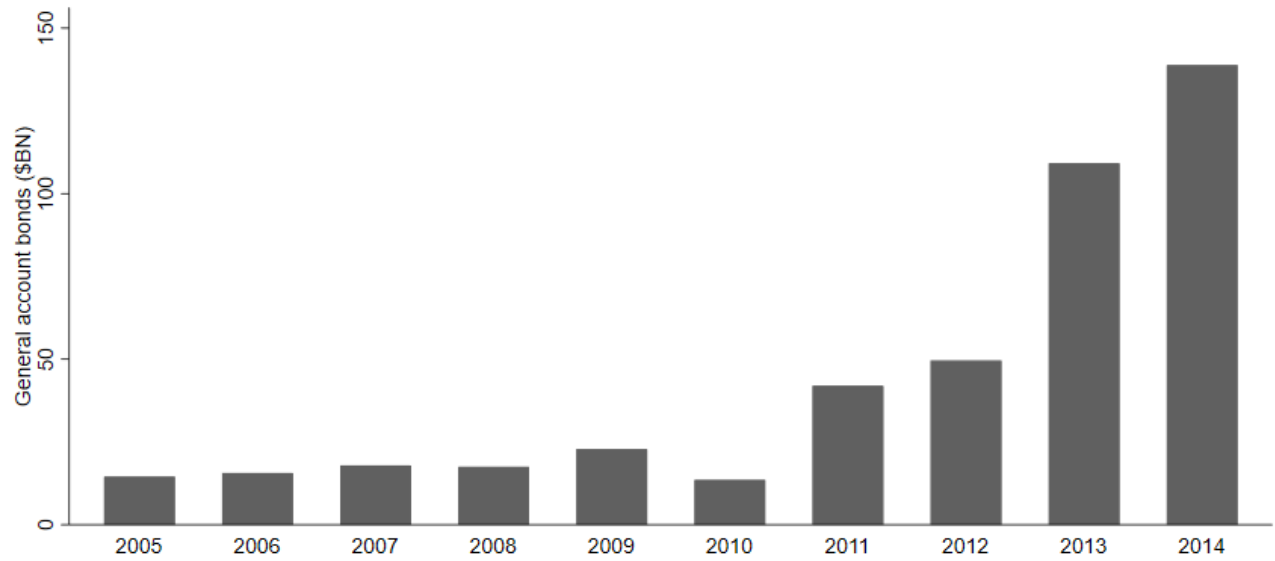


Figure 2: *Mix of life insurers' liabilities over time*

Notes: This figure shows life insurance reserves broken down by type, using data from SNL. Reserves are valued under statutory accounting rules. Annuities include both fixed annuities (general account annuities) and variable annuities (all separate account reserves). Other liabilities primarily include accident & health insurance reserves.

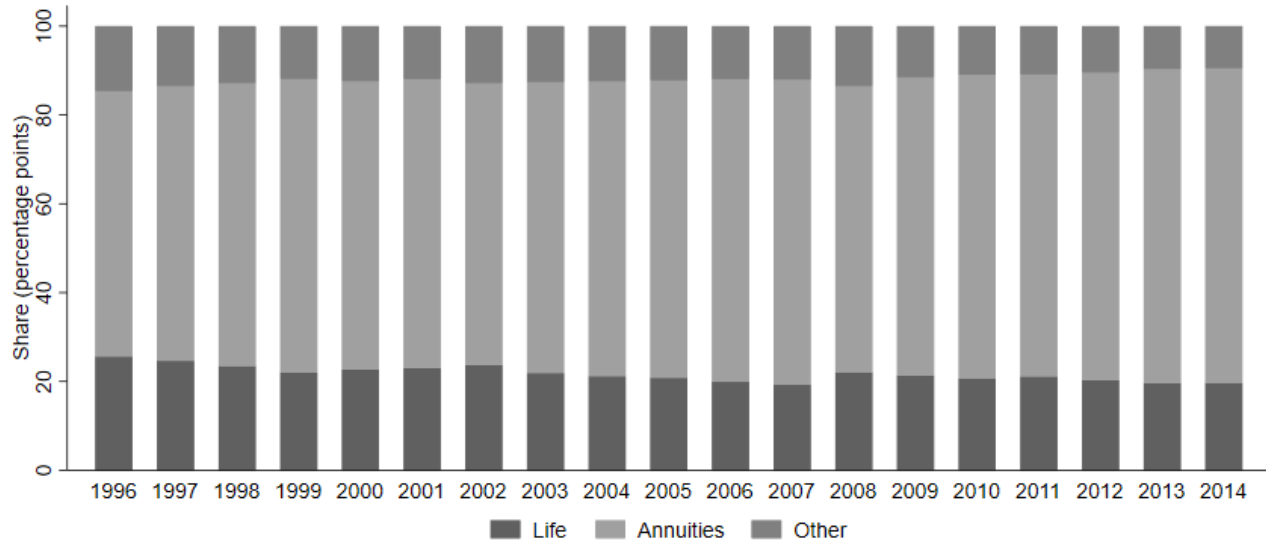
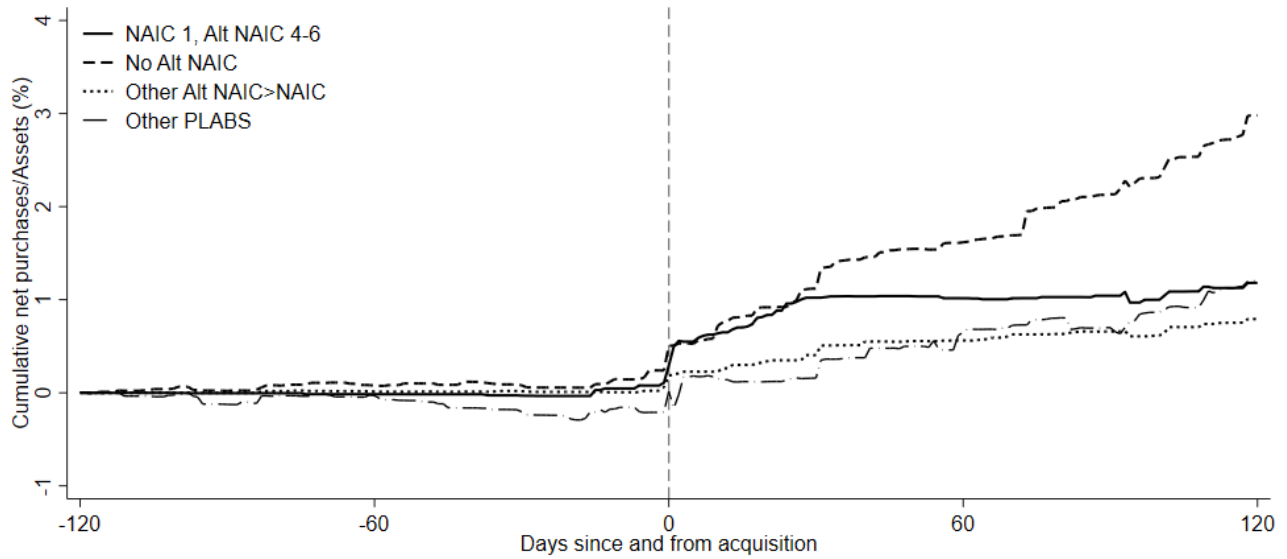


Figure 3: *Daily private ABS transactions in event time*

Notes: This figure shows daily transactions in private label asset backed securities (PLABS) for PE firms and non-PE firms in event time. Acquisition dates are marked with dashed lines - the horizontal axis shows the number of days to and since acquisition. For non-PE firms we use transactions by all-non PE firms on the same dates. For each date in event time, we plot averages across PE firms and non-PE firms after winsorizing at the 10th and 90th percentiles. We impute an alternate NAIC category for PLABS based on ratings for Moody's. PLABS are separated into four categories. First, PLABS reported as NAIC 1, with an alternate NAIC category from 4-6. Second, all other PLABS where the alternate NAIC category is higher than the reported NAIC category. Third, PLABS where we are unable to match ratings from Moody's. Fourth, all other PLABS, where the alternate NAIC category is either the same as or lower than the reported NAIC category. For each category, cumulative net purchases are shown, as a fraction of all general account bonds held as of the quarter-end prior to acquisition, in percentage points.

Panel A: PE transactions (average)



Panel B: Non-PE transactions (average)

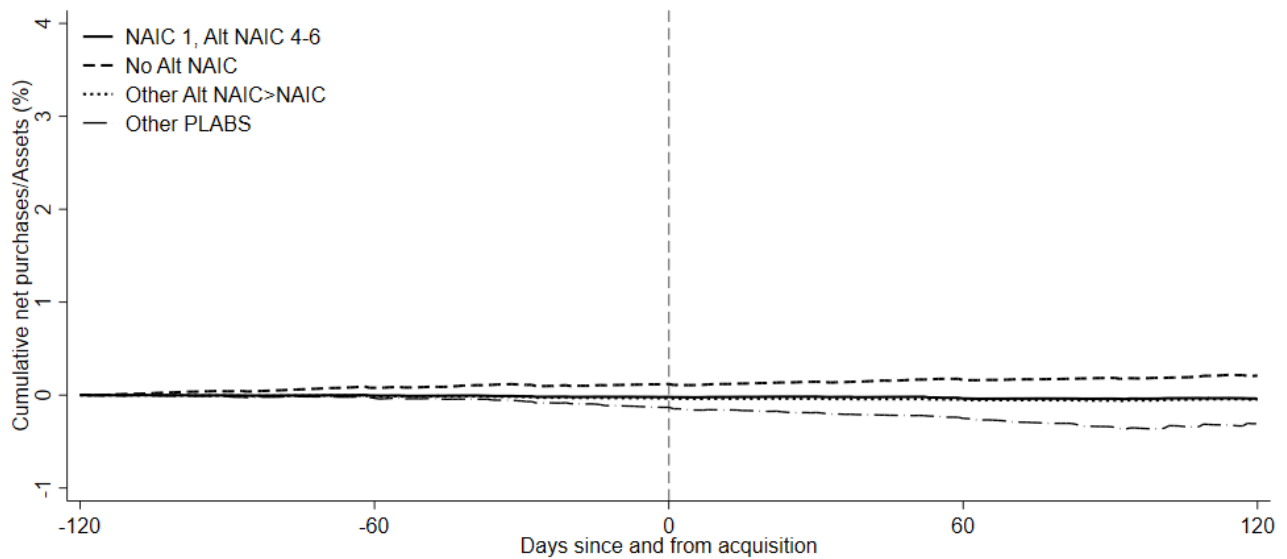
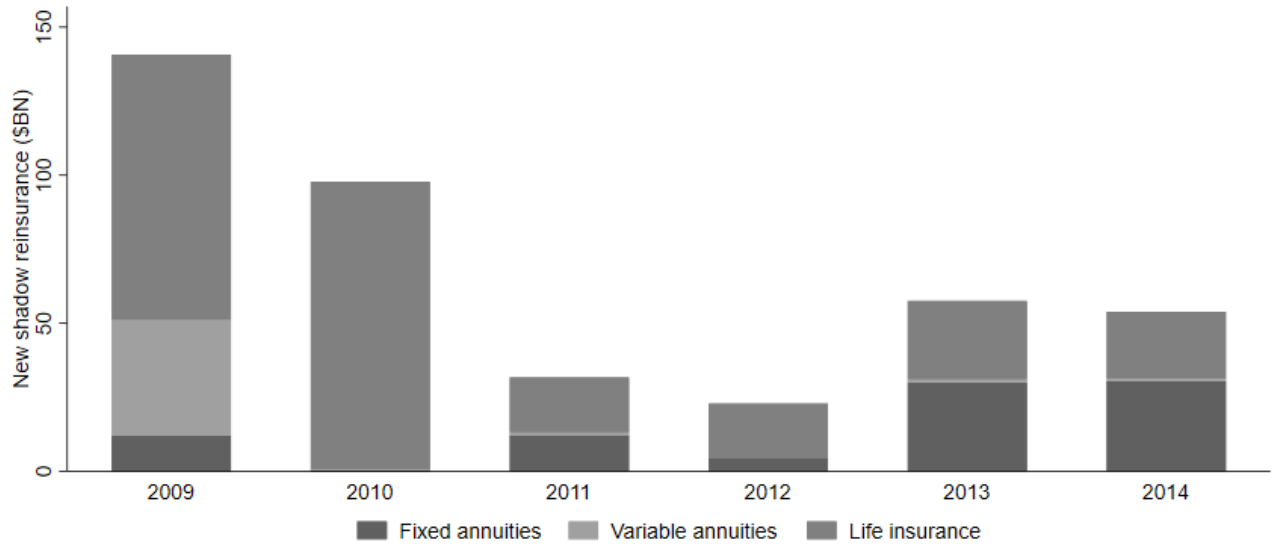


Figure 4: *New shadow reinsurance contracts by year*

Notes: This figure shows new shadow reinsurance contracts using data from A.M. Best. Shadow reinsurance contracts are with affiliated entities not rated by A.M. Best and not authorized by US insurance regulators. We separate shadow insurance by whether it covers life insurance or annuities, and further break out annuity shadow reinsurance by whether it is reported as general account (fixed) or not (variable). Panel A shows all new shadow reinsurance by type. Panel B shows new fixed annuity reinsurance based on whether the insurer is owned by PE Group A, owned by a different PE firm, or not PE owned.

Panel A: All new shadow reinsurance



Panel B: New fixed annuity shadow reinsurance

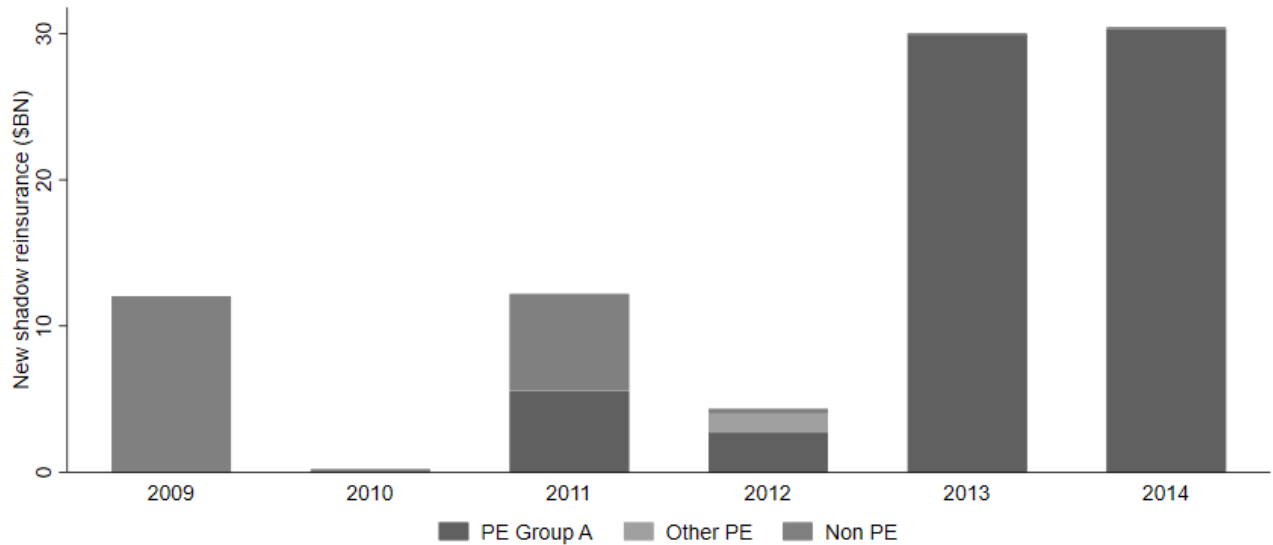
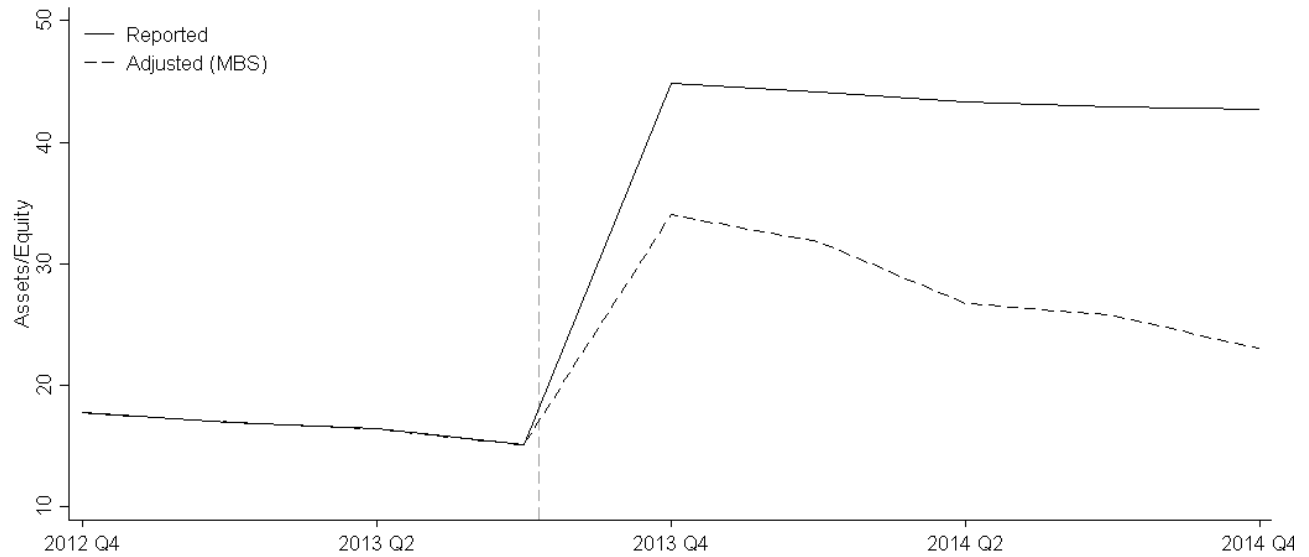


Figure 5: Leverage and ROE – an example

Notes: This figure shows leverage (Panel A) and ROE (Panel B) for PE Group B's largest subsidiary. Leverage is the ratio of assets to regulatory surplus (capital), and ROE is net income as a fraction of surplus in percentage points. Both are based on regulatory reports using statutory accounting. PE Group B's acquisition date is marked by a dashed line. Both panels also show adjusted versions post-acquisition. These show counterfactual leverage and ROE if capital increased by the additional capital that would have been required under the old rating-based treatment of private label asset backed securities. This adjustment is a lower bound estimate of the change in the statutory capital requirement.

Panel A: Leverage



Panel B: ROE

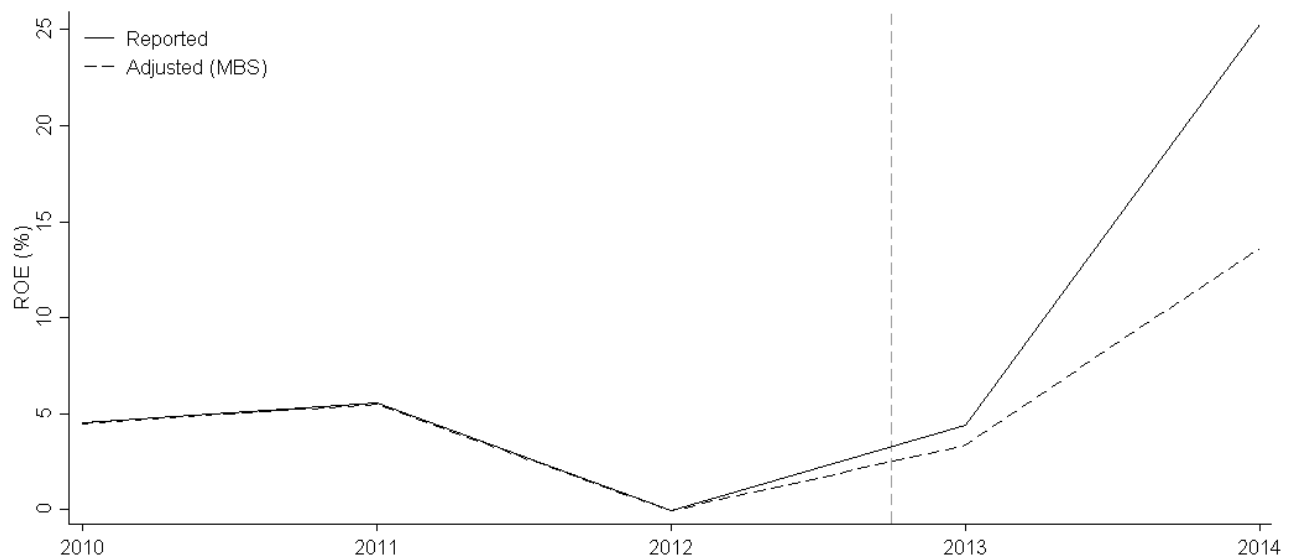
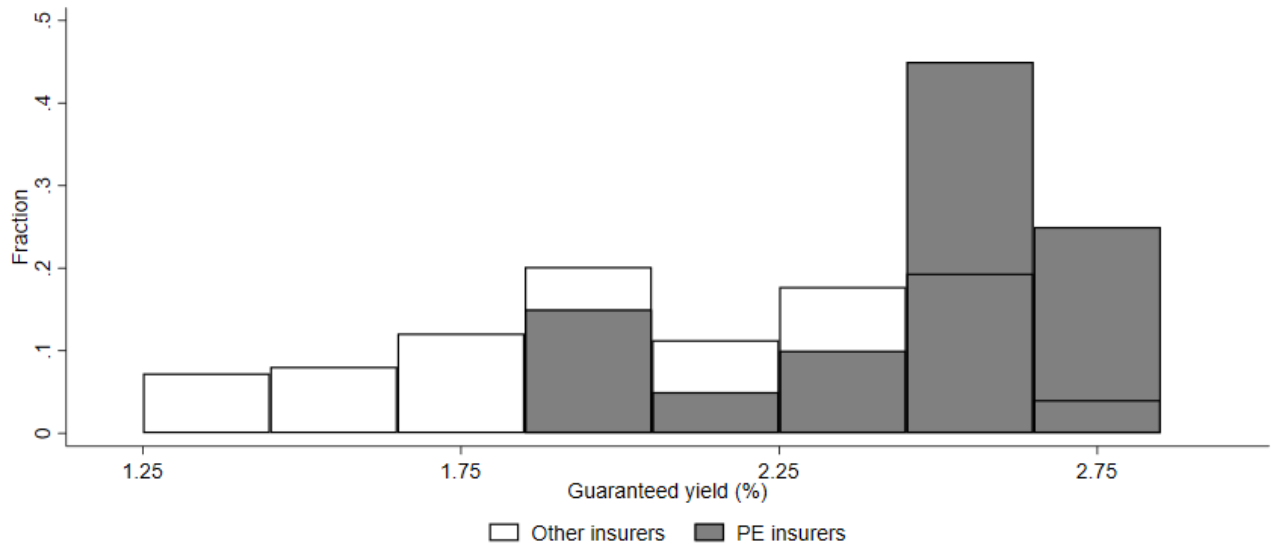


Figure 6: Pricing of 5 year guaranteed annuities

Notes: This figure shows quotes for multi-year guaranteed annuities (MYGAs) with guarantees for 5 years. It uses a single cross-section as of April 7th 2017 from Annuity Rate Watch. The sample is restricted to insurers with A.M. Best rating A- or better (144 quotes). Observations are at the quote level (e.g. One PE group subsidiary quotes 8 5Y MYGAs with different conditions). The guaranteed yield is winsorized at 5th and 95th percentile. Panel A shows the distribution of all of these quotes, separately showing quotes by PE insurers. Panel B shows only high-band or mid-band MYGAs with market value adjustments (MVAs).

Panel A: Quotes from insurers rated A- or better



Panel B: High-Band or Mid-Band MYGAs with MVAs

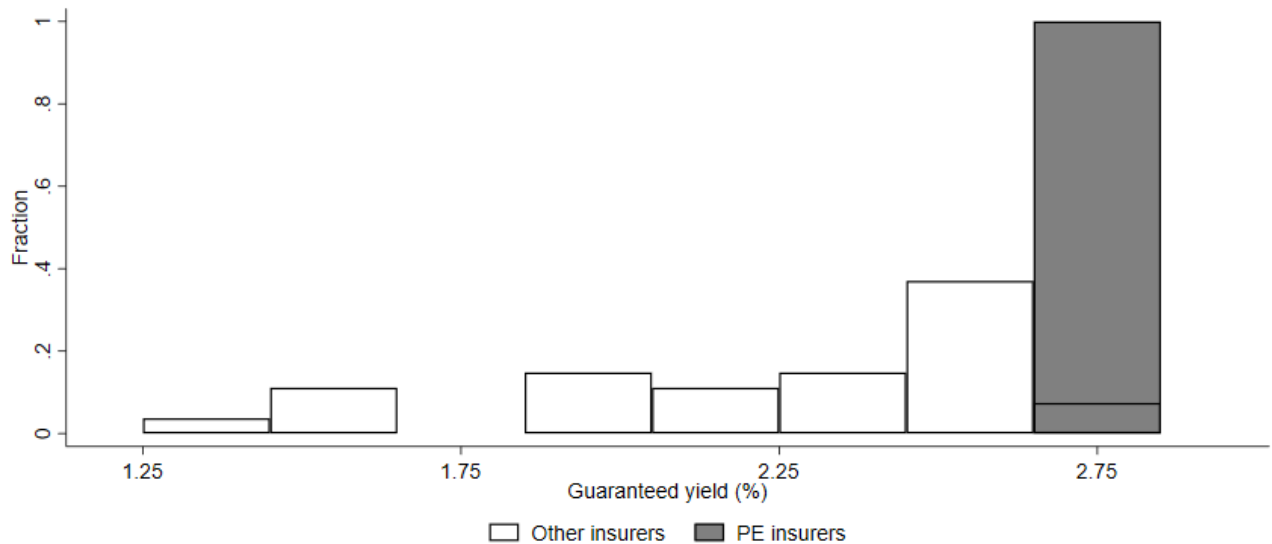


Table 1: Bond portfolio by asset class (2014)

Notes: This table shows summary statistics regarding insurers' assets as of 2014. The data is based on regulatory reporting obtained from SNL. General account bond/Total assets is the reported fair value of general account bonds (excluding hybrid securities) with bond level reporting, as a share of total assets, in percentage points. Asset class shares (Corporate-Agency ABS) and NAIC category shares (NAIC 1-6) are within general account bonds, also in percentage points. Corporate bonds include bonds issued by financials and utilities. State government bonds include bonds issued by local governments. NAIC categories are reported by insurers, and may be different for the same bond across insurers. The table shows the mean of all variables separately for PE owned insurers and non-PE owned insurers, as well as the t -statistic for the difference between these groups. All variables are winsorized at the 5th and 95th percentile within type (PE, non-PE).

| | PE | Non PE | t -stat |
|------------------------------------|------|--------|-----------|
| General account bonds/Total assets | 63.3 | 62.6 | 0.20 |
| Corporate | 48.1 | 52.4 | -1.43 |
| Fed Govt | 16.6 | 25.9 | -3.52 |
| State Govt | 2.7 | 4.7 | -3.34 |
| Foreign Govt | 0.4 | 0.5 | -0.60 |
| Private ABS | 22.3 | 7.4 | 4.90 |
| Agency ABS | 8.2 | 6.1 | 1.25 |
| NAIC 1 | 72.5 | 73.4 | -0.35 |
| NAIC 2 | 24.6 | 23.2 | 0.65 |
| NAIC 3 | 1.5 | 1.9 | -1.57 |
| NAIC 4 | 0.7 | 0.6 | 0.84 |
| NAIC 5 | 0.1 | 0.1 | 0.71 |
| NAIC 6 | 0.1 | 0.0 | 1.50 |
| Insurers | 709 | | |

Table 2: *Bond portfolio by asset class*

Notes: This table uses data on insurers' general account bond holdings. It shows regressions where the observations are at the insurer-quarter level for 2005Q4-2014Q4. As identification comes from changes in ownership structure, we drop insurers that are always PE owned in this period. The dependent variables are asset class shares within general account bond holdings. These shares are in percentage points, and are winsorized at the 5th and 95th percentile within type (PE, non-PE). Corporate bonds include bonds issued by financials and utilities. State government bonds include bonds issued by local governments. 2010-2014 is a dummy for quarters in these years. PE status is a dummy variable that takes value 1 for insurer-quarters with PE ownership. All specifications include quarter and insurer fixed effects. Standard errors (in parentheses) are double clustered by insurer (NAIC code) and quarter. The table shows the total number of insurers, and the number of insurers owned by PE firms, in the sample.

| | Corporate | Fed Govt | Private ABS | Agency ABS | State Govt | Foreign Govt |
|-------------------|------------------|-------------------|-------------------|-------------------|------------------|-------------------|
| 2010-2014 | 8.9*** (0.60) | -5.8*** (0.69) | -1.1*** (0.21) | -3.7*** (0.28) | 2.2*** (0.15) | -0.1*** (0.03) |
| PE \times After | -7.2* (2.93) | -2.8 (2.87) | 6.3*** (1.72) | 2.2 (1.63) | 0.1 (0.43) | -0.1 (0.22) |
| Mean of dep var | 46.0 | 28.9 | 9.5 | 8.9 | 3.0 | 0.6 |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Insurer FE | Y | Y | Y | Y | Y | Y |
| SE clustered by | I+Q | I+Q | I+Q | I+Q | I+Q | I+Q |
| R^2 | 0.82 | 0.81 | 0.80 | 0.74 | 0.73 | 0.72 |
| Insurer-Quarters | 30,264 | 30,264 | 30,264 | 30,264 | 30,264 | 30,264 |
| Insurers | 960 | 960 | 960 | 960 | 960 | 960 |
| PE insurers | 57 | 57 | 57 | 57 | 57 | 57 |

Table 3: *Bond portfolio by NAIC category*

Notes: This table uses data on insurers' general account bond holdings. It shows regressions where the observations are at the insurer-quarter level for 2005Q4-2014Q4. As identification comes from changes in ownership structure, we drop insurers that are always PE owned in this period. The dependent variables are NAIC category shares within general account bond holdings. These shares are in percentage points, and are winsorized at the 5th and 95th percentile within type (PE, non-PE). NAIC categories are reported by insurers, and may be different for the same bond across insurers. PE status is a dummy variable that takes value 1 for insurer-quarters with PE ownership. All specifications include quarter and insurer fixed effects. Standard errors (in parentheses) are double clustered by insurer (NAIC code) and quarter. The table shows the total number of insurers, and the number of insurers owned by PE firms, in the sample.

| | NAIC 1 | NAIC 2 | NAIC 3 | NAIC 4 | NAIC 5 | NAIC 6 |
|-------------------|---------------|----------------|---------------|---------------|---------------|---------------|
| PE \times After | 1.2 (1.45) | -1.6 (1.37) | 0.3 (0.16) | 0.1 (0.08) | 0.1 (0.04) | 0.0 (0.01) |
| Mean of dep var | 79.0 | 18.1 | 1.5 | 0.6 | 0.2 | 0.1 |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Insurer FE | Y | Y | Y | Y | Y | Y |
| SE clustered by | I+Q | I+Q | I+Q | I+Q | I+Q | I+Q |
| R^2 | 0.83 | 0.82 | 0.68 | 0.62 | 0.49 | 0.49 |
| Insurer-Quarters | 30,264 | 30,264 | 30,264 | 30,264 | 30,264 | 30,264 |
| Insurers | 960 | 960 | 960 | 960 | 960 | 960 |
| PE Insurers | 57 | 57 | 57 | 57 | 57 | 57 |

Table 4: Private ABS portfolio by NAIC category

Notes: This table uses data on insurers' private label asset backed security holdings (PLABS). It shows regressions where the observations are at the insurer-quarter level for 2007Q4-2014Q4 (capital treatment of PLABS changed starting 2008Q4). As identification comes from changes in ownership structure, we drop insurers that are always PE owned in this period. The sample is restricted to insurer-quarters with positive PLABS holdings, and to PLABS with a matched rating from Moody's. The dependent variables are NAIC category shares within PLABS. Panel A shows shares based on reported NAIC categories, which can be different for the same bond across insurers. Panel B shows shares by alternate NAIC category, imputed based on ratings from Moody's. These shares are in percentage points, and are winsorized at the 5th and 95th percentile within type (PE, non-PE). PE status is a dummy variable that takes value 1 for insurer-quarters with PE ownership. All specifications include quarter and insurer fixed effects. Standard errors (in parentheses) are double clustered by insurer (NAIC code) and quarter. The table shows the total number of insurers, and the number of insurers owned by PE firms, in the sample.

Panel A: Reported NAIC category

| | NAIC 1 | NAIC 2 | NAIC 3 | NAIC 4 | NAIC 5 | NAIC 6 |
|-------------------|---------------|---------------|---------------|---------------|----------------|----------------|
| PE \times After | 0.5 (2.59) | 0.1 (1.30) | 0.4 (0.52) | 0.3 (0.32) | -0.1 (0.11) | -0.1 (0.09) |
| Mean of dep var | 78.7 | 11.3 | 2.8 | 1.6 | 0.6 | 0.4 |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Insurer FE | Y | Y | Y | Y | Y | Y |
| SE clustered by | I+Q | I+Q | I+Q | I+Q | I+Q | I+Q |
| R^2 | 0.69 | 0.61 | 0.50 | 0.50 | 0.43 | 0.56 |
| Insurer-Quarters | 12,185 | 12,185 | 12,185 | 12,185 | 12,185 | 12,185 |
| Insurers | 579 | 579 | 579 | 579 | 579 | 579 |
| PE Insurers | 34 | 34 | 34 | 34 | 34 | 34 |

Panel B: Alternate NAIC category

| | NAIC 1 | NAIC 2 | NAIC 3 | NAIC 4 | NAIC 5 | NAIC 6 |
|-------------------|------------------|---------------|----------------|---------------|----------------|-----------------|
| PE \times After | -11.2* (5.61) | 0.3 (2.77) | 2.1* (0.83) | 0.7 (0.38) | 3.1* (1.35) | 7.4** (2.33) |
| Mean of dep var | 65.7 | 13.6 | 4.5 | 1.6 | 5.9 | 3.3 |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Insurer FE | Y | Y | Y | Y | Y | Y |
| SE clustered by | I+Q | I+Q | I+Q | I+Q | I+Q | I+Q |
| R^2 | 0.75 | 0.68 | 0.57 | 0.57 | 0.67 | 0.66 |
| Insurer-Quarters | 12,185 | 12,185 | 12,185 | 12,185 | 12,185 | 12,185 |
| Insurers | 579 | 579 | 579 | 579 | 579 | 579 |
| PE Insurers | 34 | 34 | 34 | 34 | 34 | 34 |

Table 5: *Private ABS portfolio by alternate NAIC category and time period*

Notes: This table uses data on insurers' private label asset backed security holdings (PLABS). It shows regressions where the observations are at the insurer-quarter level for 2007Q4-2014Q4 (capital treatment of PLABS changed starting 2008Q4). As identification comes from changes in ownership structure, we drop insurers that are always PE owned in this period. The sample is restricted to insurer-quarters with positive PLABS holdings, and to PLABS with a matched rating from Moody's. The dependent variables are alternate NAIC category shares within PLABS. Alternate NAIC categories are imputed based on ratings from Moody's. These shares are in percentage points, and are winsorized at the 5th and 95th percentile within type (PE, non-PE). 2010-2014 is a dummy for quarters in these years. PE status is a dummy variable that takes value 1 for insurer-quarters with PE ownership. All specifications include quarter and insurer fixed effects. Standard errors (in parentheses) are double clustered by insurer (NAIC code) and quarter. The table shows the total number of insurers, and the number of insurers owned by PE firms, in the sample.

| | NAIC 1 | NAIC 2 | NAIC 3 | NAIC 4 | NAIC 5 | NAIC 6 |
|-------------------|--------------------|------------------|------------------|------------------|------------------|------------------|
| 2010-2014 | -22.5*** (0.88) | 3.4*** (0.57) | 3.1*** (0.18) | 1.4*** (0.05) | 5.3*** (0.19) | 4.0*** (0.16) |
| PE \times After | -11.2* (5.61) | 0.3 (2.77) | 2.1* (0.83) | 0.7 (0.38) | 3.1* (1.35) | 7.4** (2.33) |
| Mean of dep var | 65.7 | 13.6 | 4.5 | 1.6 | 5.9 | 3.3 |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Insurer FE | Y | Y | Y | Y | Y | Y |
| SE clustered by | I+Q | I+Q | I+Q | I+Q | I+Q | I+Q |
| R^2 | 0.75 | 0.68 | 0.57 | 0.57 | 0.67 | 0.66 |
| Insurer-Quarters | 12,185 | 12,185 | 12,185 | 12,185 | 12,185 | 12,185 |
| Insurers | 579 | 579 | 579 | 579 | 579 | 579 |
| PE Insurers | 34 | 34 | 34 | 34 | 34 | 34 |

Table 6: *Bond portfolio by asset class and PE group*

Notes: This table uses data on insurers' general account bond holdings. It shows regressions where the observations are at the insurer-quarter level for 2005Q4-2014Q4. As identification comes from changes in ownership structure, we drop insurers that are always PE owned in this period. The dependent variables are asset class shares within general account bond holdings. These shares are in percentage points, and are winsorized at the 5th and 95th percentile within type (PE, non-PE). Corporate bonds include bonds issued by financials and utilities. State government bonds include bonds issued by local governments. PE Group A, B, and C are dummy variables that take value 1 for insurer-quarters with ownership by these PE groups. Other PE is a dummy variable that takes value 1 for all other insurer-quarters with PE ownership. All specifications include quarter and insurer fixed effects. Standard errors (in parentheses) are double clustered by insurer (NAIC code) and quarter. The table shows the total number of insurers, the number of insurers owned by PE Groups A, B, and C, and the number of insurers owned by other PE firms, in the sample.

| | Corporate | Fed Govt | Private ABS | Agency ABS | State Govt | Foreign Govt |
|-------------------|--------------------|----------------|-------------------|-------------------|----------------|----------------|
| PE Group A | -25.1*** (6.86) | 3.9 (4.39) | 16.9** (5.89) | -5.6 (3.05) | -1.1 (0.61) | 0.2 (0.41) |
| PE Group B | -20.5*** (4.30) | -3.9 (2.72) | 26.5*** (3.39) | -4.9*** (1.44) | 0.1 (0.42) | -0.2 (0.30) |
| PE Group C | -10.4 (5.32) | -6.7 (5.64) | 23.6*** (3.67) | -3.2 (3.38) | -1.0 (0.56) | 0.3* (0.14) |
| Other PE | -3.7 (3.51) | -2.7 (3.65) | 0.6 (0.82) | 4.6* (1.83) | 0.4 (0.54) | -0.2 (0.28) |
| Mean of dep var | 46.0 | 28.9 | 9.5 | 8.9 | 3.0 | 0.6 |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Insurer FE | Y | Y | Y | Y | Y | Y |
| SE clustered by | I+Q | I+Q | I+Q | I+Q | I+Q | I+Q |
| R^2 | 0.82 | 0.81 | 0.81 | 0.74 | 0.73 | 0.72 |
| Insurer-Quarters | 30,264 | 30,264 | 30,264 | 30,264 | 30,264 | 30,264 |
| Insurers | 960 | 960 | 960 | 960 | 960 | 960 |
| PE Group A | 6 | 6 | 6 | 6 | 6 | 6 |
| PE Group B | 4 | 4 | 4 | 4 | 4 | 4 |
| PE Group C | 7 | 7 | 7 | 7 | 7 | 7 |
| Other PE Insurers | 42 | 42 | 42 | 42 | 42 | 42 |

Table 7: *Private ABS portfolio by alternate NAIC category and PE group*

Notes: This table uses data on insurers' private label asset backed security holdings (PLABS). It shows regressions where the observations are at the insurer-quarter level for 2007Q4-2014Q4 (capital treatment of PLABS changed starting 2008Q4). As identification comes from changes in ownership structure, we drop insurers that are always PE owned in this period. The sample is restricted to insurer-quarters with positive PLABS holdings, and to PLABS with a matched rating from Moody's. The dependent variables are alternate NAIC category shares within PLABS. Alternate NAIC categories are imputed based on ratings from Moody's. These shares are in percentage points, and are winsorized at the 5th and 95th percentile within type (PE, non-PE). PE Group A, B, and C are dummy variables that take value 1 for insurer-quarters with ownership by these PE groups. Other PE is a dummy variable that takes value 1 for all other insurer-quarters with PE ownership. All specifications include quarter and insurer fixed effects. Standard errors (in parentheses) are double clustered by insurer (NAIC code) and quarter. The table shows the total number of insurers, the number of insurers owned by and PE Groups A, B, and C, and the number of insurers owned by other PE firms, in the sample.

| | NAIC 1 | NAIC 2 | NAIC 3 | NAIC 4 | NAIC 5 | NAIC 6 |
|-------------------|--------------------|----------------|----------------|----------------|-------------------|-------------------|
| PE Group A | -46.4*** (7.27) | 8.3* (3.87) | 4.1* (1.94) | 2.3* (0.91) | 10.9*** (3.26) | 20.8*** (4.90) |
| PE Group B | -40.8*** (9.77) | -1.1 (3.09) | 1.4* (0.74) | 3.2* (1.26) | 11.2* (4.61) | 30.8*** (2.77) |
| PE Group C | -1.2 (6.54) | 1.6 (5.38) | 3.7 (2.42) | -0.6 (0.54) | -0.9 (1.51) | -1.0 (1.53) |
| Other PE | 1.8 (6.85) | -2.3 (4.25) | 1.0 (0.97) | 0.1 (0.27) | 0.5 (1.29) | 1.8 (1.28) |
| Mean of dep var | 65.7 | 13.6 | 4.5 | 1.6 | 5.9 | 3.3 |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Insurer FE | Y | Y | Y | Y | Y | Y |
| SE clustered by | I+Q | I+Q | I+Q | I+Q | I+Q | I+Q |
| R^2 | 0.76 | 0.68 | 0.57 | 0.57 | 0.67 | 0.70 |
| Insurer-Quarters | 12,185 | 12,185 | 12,185 | 12,185 | 12,185 | 12,185 |
| Insurers | 579 | 579 | 579 | 579 | 579 | 579 |
| PE Group A | 5 | 5 | 5 | 5 | 5 | 5 |
| PE Group B | 3 | 3 | 3 | 3 | 3 | 3 |
| PE Group C | 6 | 6 | 6 | 6 | 6 | 6 |
| Other PE Insurers | 20 | 20 | 20 | 20 | 20 | 20 |

Table 8: *Reduction in capital requirement due to change in treatment of ABS*

Notes: This table uses data on insurers' private label asset backed security holdings (PLABS). It shows regressions where the observations are at the insurer-quarter level for 2007Q4-2014Q4 (capital treatment of PLABS changed starting 2008Q4). As identification comes from changes in ownership structure, we drop insurers that are always PE owned in this period. The sample is restricted to insurer-quarters with positive PLABS holdings, and to PLABS with a matched rating from Moody's. The dependent variable is the reduction in the capital requirement relative to the previous, rating based, system for determining capital charges for PLABS. Specifically, R_1 Reduction is $\Delta R_1 / (R_1 + \Delta R_1) \times 100$, where ΔR_1 is the change in the capital requirement, and R_1 is the current capital requirement on the full general account portfolio. Capital reduction is a lower bound estimate of the corresponding change in the overall capital requirement. The dependent variable is winsorized at the 5th and 95th percentile within type (PE, non-PE). PE status is a dummy variable that takes value 1 for insurer-quarters with PE ownership. PE Group A, B, and C are dummy variables that take value 1 for insurer-quarters with ownership by these PE groups. Other PE is a dummy variable that takes value 1 for all other insurer-quarters with PE ownership. Both specifications include quarter and insurer fixed effects. Standard errors (in parentheses) are double clustered by insurer (NAIC code) and quarter. The first specification shows the total number of insurers, and the number of insurers owned by PE firms, in the sample. The second specification shows the number of insurers owned by PE Groups A, B, and C, and the number of insurers owned by other PE firms.

| | R_1 Reduction | R_1 Reduction | Capital Reduction | Capital Reduction |
|-------------------|-------------------|--------------------|-------------------|-------------------|
| PE \times After | 19.2*** (4.91) | | 10.0** (3.28) | |
| PE Group A | | 52.7*** (11.07) | | 29.3*** (7.71) |
| PE Group B | | 55.3*** (9.18) | | 37.1*** (8.43) |
| PE Group C | | 3.8 (4.61) | | -0.2 (0.14) |
| Other PE | | 7.3* (3.19) | | 2.4* (1.23) |
| Mean of dep var | 12.7 | 12.7 | 0.8 | 0.8 |
| Quarter FE | Y | Y | Y | Y |
| Insurer FE | Y | Y | Y | Y |
| SE clustered by | I+Q | I+Q | I+Q | I+Q |
| R^2 | 0.72 | 0.73 | 0.52 | 0.70 |
| Insurer-Quarters | 12,185 | 12,185 | 12,177 | 12,177 |
| Insurers | 579 | 579 | 579 | 579 |
| PE Insurers | 34 | | 34 | |
| PE Group A | | 5 | | 5 |
| PE Group B | | 3 | | 3 |
| PE Group C | | 6 | | 6 |
| Other PE Insurers | | 20 | | 20 |

Table 9: *Adjusted ratings for insurance subsidiaries of two PE groups (2014)*

Notes: This table shows A.M. Best ratings for insurers owned by PE Groups A and B as of 2014 with assets above \$10 billion, as well as ratings adjusted for these insurers' private label asset backed securities (PLABS) holdings. A.M. Best (2016) states that for each 10 percentage point reduction in the ratio of actual capital held to required capital, it views the implied balance sheet strength to fall by one rating notch. We calculate the ratio of statutory surplus to required surplus, in percentage points. We then calculate what this ratio would have been if required capital increased by the additional capital that would have been required under the old rating-based treatment of PLABS. We report a range of adjustments going from a lower bound calculation to an upper bound calculation, the latter based only on the R_1 component of capital requirements. We show an adjusted rating assuming A.M. Best's ratio (calculated in a slightly different manner) would change in a similar way. A.M. Best uses the capital ratio as just one input into its rating process.

| Group | Insurer | A.M. Best Rating | Range of implied downgrade notches | Range of adjusted A.M. Best Rating |
|------------|---------|------------------|---------------------------------------|---------------------------------------|
| PE Group A | 1 | A- | 5-6 | C++ to C+ |
| PE Group A | 2 | A- | 1-3 | B++ to B |
| PE Group B | 1 | B++ | 4-5 | C++ to C+ |
| PE Group B | 2 | B++ | 0-2 | B++ to B |

Table 10: *Mean ROE and adjusted ROE by insurer type (2014)*

Notes: This table shows ROE and adjusted ROE as of 2014. The sample is restricted to insurer-quarters with positive private label asset backed securities (PLABS) holdings in at least one year from 2005-2014. ROE is net income as a fraction of surplus in percentage points, based on regulatory reports using statutory accounting. Adjusted ROE shows a counterfactual calculation if capital increased by the additional capital that would have been required under the old rating-based treatment of PLABS. This adjustment is a lower bound estimate of the reduction in ROE. Both ROE and adjusted ROE are winsorized at the 10th and 90th percentile within type (PE, non-PE). The table shows the mean of both variables separately for PE owned insurers and non-PE owned insurers, as well as the t -statistic for the difference between these groups.

| | PE | Non PE | t -stat |
|--------------|------|--------|-----------|
| ROE | 11.4 | 7.3 | 2.22 |
| Adjusted ROE | 10.0 | 7.2 | 1.67 |
| Insurers | 516 | | |

A Matching

Table A.1: *Summary statistics before and after matching*

Notes: This table shows summary statistics comparing PE owned and non-PE owned insurers before and after matching. Due to data constraints, we switch to data at an annual frequency. We use data from 2007-2014 (the rules for capital treatment of private labeled asset backed securities changed in 2008). As identification comes from changes in ownership structure, we drop insurers that are always PE owned in this period. We restrict the sample to insurers with positive general account reserves that hold PLABS at least once during the sample period. We match each PE owned insurer to a single non-PE owned insurer based on data as of the year prior to acquisition. The matched sample consists of 28 PE owned insurers and 28 non-PE owned insurers. We match via a logit propensity score constructed based on: $\ln(\text{Assets})$, general account liabilities/total liabilities (general account share, percentage points), annuity share of general account liabilities (percentage points), and regulatory surplus held divided by required surplus (surplus ratio, percentage points). Panel A shows the means of our matching variables separately for PE owned insurers and non-PE owned insurers, as well as the t -statistic for the difference between these groups. Panel B shows these summary statistics for the matched sample, in the year matched (the year prior to acquisition for PE insurers, and the year a non-PE insurer is matched).

Panel A: Full sample

| | PE | Non PE | t -stat |
|-----------------------|-------|--------|-----------|
| Assets (MM) | 6,407 | 10,268 | -3.13 |
| General account share | 88 | 89 | -0.19 |
| Annuity share | 53 | 28 | 5.54 |
| Surplus ratio | 109 | 112 | -1.81 |
| Insurer-Years | 4,213 | | |

Panel B: Matched sample in year matched

| | PE | Matched | t -stat |
|-----------------------|-------|---------|-----------|
| Assets (MM) | 5,903 | 5,514 | 0.09 |
| General account share | 87 | 91 | -0.58 |
| Annuity share | 47 | 48 | -0.04 |
| Surplus ratio | 113 | 108 | 0.83 |
| Insurer-Years | 56 | | |

Table A.2: *Bond portfolio by asset class*

Notes: This table uses data on insurers' general account bond holdings. It shows regressions where the observations are at the insurer-year level for 2007-2014. As identification comes from changes in ownership structure, we drop insurers that are always PE owned in this period. The dependent variables are asset class shares within general account bond holdings. These shares are in percentage points, and are winsorized at the 5th and 95th percentile within type (PE, non-PE). Corporate bonds include bonds issued by financials and utilities. State government bonds include bonds issued by local governments. PE status is a dummy variable that takes value 1 for insurer-years with PE ownership. All specifications include year and insurer fixed effects. Standard errors (in parentheses) are double clustered by insurer (NAIC code) and year, and do not adjust for estimated propensity scores. Panel A shows the full sample for insurer-years with all data used for matching. Panel B shows the matched sample. The panels show the total number of insurers, and the number of insurers owned by PE firms, in the sample.

Panel A: Full sample

| | Corporate | Fed Govt | Private ABS | Agency ABS | State Govt | Foreign Govt |
|-------------------|------------------|----------------|-------------------|----------------|-----------------|---------------|
| PE \times After | -8.0** (2.50) | -0.9 (1.42) | 12.2*** (3.09) | -2.0 (1.60) | -0.8* (0.41) | 0.1 (0.16) |
| Mean of dep var | 54.0 | 17.8 | 12.0 | 9.5 | 3.2 | 0.7 |
| Year FE | Y | Y | Y | Y | Y | Y |
| Insurer FE | Y | Y | Y | Y | Y | Y |
| SE clustered by | I+Y | I+Y | I+Y | I+Y | I+Y | I+Y |
| R^2 | 0.86 | 0.80 | 0.80 | 0.77 | 0.81 | 0.76 |
| Insurer-Years | 4,213 | 4,213 | 4,213 | 4,213 | 4,213 | 4,213 |
| Insurers | 572 | 572 | 572 | 572 | 572 | 572 |
| PE Insurers | 28 | 28 | 28 | 28 | 28 | 28 |

Panel B: Matched sample

| | Corporate | Fed Govt | Private ABS | Agency ABS | State Govt | Foreign Govt |
|-------------------|------------------|---------------|------------------|----------------|----------------|----------------|
| PE \times After | -9.3** (3.03) | 1.4 (2.06) | 10.0** (2.96) | -1.7 (1.97) | -0.7 (0.59) | -0.0 (0.17) |
| Mean of dep var | 52.8 | 16.1 | 14.8 | 10.6 | 2.3 | 0.5 |
| Year FE | Y | Y | Y | Y | Y | Y |
| Insurer FE | Y | Y | Y | Y | Y | Y |
| SE clustered by | I+Y | I+Y | I+Y | I+Y | I+Y | I+Y |
| R^2 | 0.83 | 0.79 | 0.74 | 0.71 | 0.74 | 0.59 |
| Insurer-Years | 444 | 444 | 444 | 444 | 444 | 444 |
| Insurers | 56 | 56 | 56 | 56 | 56 | 56 |
| PE Insurers | 28 | 28 | 28 | 28 | 28 | 28 |

Table A.3: Private ABS by alternate NAIC category

Notes: This table uses data on insurers' private label asset backed security holdings (PLABS). It shows regressions where the observations are at the insurer-year level for 2007-2014 (capital treatment of PLABS changed starting 2008). As identification comes from changes in ownership structure, we drop insurers that are always PE owned in this period. The sample is restricted to insurer-quarters with positive PLABS holdings, and to PLABS with a matched rating from Moody's. The dependent variables are alternate NAIC category shares within PLABS. Alternate NAIC categories are imputed based on ratings from Moody's. These shares are in percentage points, and are winsorized at the 5th and 95th percentile within type (PE, non-PE). PE status is a dummy variable that takes value 1 for insurer-quarters with PE ownership. All specifications include year and insurer fixed effects. Standard errors (in parentheses) are double clustered by insurer (NAIC code) and year, and do not adjust for estimated propensity scores. Panel A shows the full sample for insurer-years with all data used for matching. Panel B shows the matched sample. The panels show the total number of insurers, and the number of insurers owned by PE firms, in the sample.

Panel A: Full sample

| | NAIC 1 | NAIC 2 | NAIC 3 | NAIC 4 | NAIC 5 | NAIC 6 |
|-------------------|------------------|---------------|----------------|----------------|---------------|-----------------|
| PE \times After | -11.9* (5.35) | 0.1 (2.56) | 2.2* (0.90) | 1.2* (0.50) | 4.0 (2.04) | 7.3** (2.55) |
| Mean of dep var | 67.3 | 13.4 | 4.1 | 1.5 | 5.4 | 3.1 |
| Year FE | Y | Y | Y | Y | Y | Y |
| Insurer FE | Y | Y | Y | Y | Y | Y |
| SE clustered by | I+Y | I+Y | I+Y | I+Y | I+Y | I+Y |
| R^2 | 0.74 | 0.67 | 0.56 | 0.56 | 0.65 | 0.64 |
| Insurer-Years | 3,379 | 3,379 | 3,379 | 3,379 | 3,379 | 3,379 |
| Insurers | 565 | 565 | 565 | 565 | 565 | 565 |
| PE Insurers | 28 | 28 | 28 | 28 | 28 | 28 |

Panel B: Matched sample

| | NAIC 1 | NAIC 2 | NAIC 3 | NAIC 4 | NAIC 5 | NAIC 6 |
|-------------------|-----------------|---------------|----------------|---------------|---------------|-----------------|
| PE \times After | -10.8 (6.05) | 0.3 (2.78) | 2.6* (1.14) | 1.1 (0.60) | 4.0 (2.40) | 7.0** (2.60) |
| Mean of dep var | 66.0 | 14.0 | 4.3 | 1.6 | 5.9 | 4.3 |
| Year FE | Y | Y | Y | Y | Y | Y |
| Insurer FE | Y | Y | Y | Y | Y | Y |
| SE clustered by | I+Y | I+Y | I+Y | I+Y | I+Y | I+Y |
| R^2 | 0.73 | 0.78 | 0.48 | 0.51 | 0.66 | 0.59 |
| Insurer-Years | 353 | 353 | 353 | 353 | 353 | 353 |
| Insurers | 56 | 56 | 56 | 56 | 56 | 56 |
| PE Insurers | 28 | 28 | 28 | 28 | 28 | 28 |

Table A.4: *Reduction in capital requirement, impact on leverage and ROE*

Notes: This table uses insurance regulatory data. It shows regressions where the observations are at the insurer-year level for 2007-2014. As identification comes from changes in ownership structure, we drop insurers that are always PE owned in this period. The first dependent variable is the reduction in the capital requirement (RBC reduction) relative to the previous, rating based, system for determining capital charges for private label asset backed securities (PLABS). Specifically, RBC reduction is $\Delta R_1 / (R_1 + \Delta R_1) \times 100$, where ΔR_1 is the change in the capital requirement, and R_1 is the current capital requirement on the full general account portfolio. This variable is an upper bound estimate of the change in the capital requirement based only on the change in the R_1 component of capital requirements. The second dependent variable is the increase in leverage relative to the old, rating based, system for capital treatment of PLABS, in percentage points. As leverage is the ratio of assets to equity, this increase is also how much return on equity would increase, holding return on assets fixed. The third dependent variable is ROE, the ratio of net income to regulatory surplus, in percentage points. All three dependent variables are in percentage points, and are winsorized at the 5th and 95th percentile within type (PE, non-PE). PE status is a dummy variable that takes value 1 for insurer-years with PE ownership. PE A/B/C \times 2014 is a dummy for insurers owned by three of the PE groups in our sample in 2014. All specifications include year and insurer fixed effects. Standard errors (in parentheses) are double clustered by insurer (NAIC code) and year, and do not adjust for estimated propensity scores. Specifications on the left use the full sample for insurer-years with all data used for matching, while specifications on the right use the matched sample. The table shows the total number of insurers, and the number of insurers owned by PE firms, in the samples for each specification.

| | Full sample | | | Matched sample | | |
|------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | RBC Reduction | Leverage Increase | ROE | RBC Reduction | Leverage Increase | ROE |
| PE \times After | 14.7** (5.57) | 20.7** (7.97) | 3.9 (3.60) | 14.7* (5.51) | 20.1* (7.83) | 3.7 (3.75) |
| PE A/B/C \times 2014 | 15.9*** (4.55) | 17.6* (7.58) | 10.6*** (2.67) | 18.8*** (4.55) | 20.8* (8.12) | 10.8*** (2.35) |
| Mean of dep var | 9.1 | 2.1 | 5.2 | 12.1 | 5.9 | 4.1 |
| Year FE | Y | Y | Y | Y | Y | Y |
| Insurer FE | Y | Y | Y | Y | Y | Y |
| SE clustered by | I+Y | I+Y | I+Y | I+Y | I+Y | I+Y |
| R^2 | 0.64 | 0.51 | 0.48 | 0.64 | 0.47 | 0.41 |
| Insurer-Years | 4,213 | 4,213 | 4,213 | 444 | 444 | 444 |
| Insurers | 572 | 572 | 572 | 56 | 56 | 56 |
| PE Insurers | 28 | 28 | 28 | 28 | 28 | 28 |